

# The Production of Medieval Mosaics: The Orvieto Evidence

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The mosaics on the facade of Orvieto cathedral have been variously restored or replaced during the course of the centuries, and only one gable of mosaic retains any trace of original tesserae (Fig. 1).<sup>1</sup> Though little physical evidence remains, for once we have been left with abundant documentary evidence for a cycle of medieval mosaics. The documentation for these works (in the Opera del Duomo and State archives at Orvieto) provides a unique testimony to the technical and workshop procedures of Trecento mosaicists, and the information about workshop organization and the supply of materials has ramifications for mosaic production in other Italian centers.<sup>2</sup> Only a small portion of these documents has appeared in published form, in the writings of G. della Valle during

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<sup>1</sup>For the history of the mosaics, see L. Fumi, *Il Duomo di Orvieto* (Rome, 1891), 139–64. I would like to thank Paul Williamson for his assistance in obtaining photographs of the mosaic in the Victoria and Albert Museum, London, and a copy of the technical report which concluded that some areas of the work were original. Cf. the cautionary remarks of L. Fumi, “L’Oragna e il suo preteso mosaico nel Museo di Kensington,” *Rivista d’arte* 3 (1905), 211–27.

<sup>2</sup>Although the documentation for the apse mosaic at Pisa cathedral is not as detailed as that for Orvieto, it, too, provides essential information on mosaic production; see G. Trenta, *I mosaici del Duomo di Pisa e i loro autori* (Florence, 1896), 72–107. Cf. the limited sources for the mosaics at San Marco, O. Demus, *Die Mosaiken von San Marco in Venedig 1100–1300* (Vienna, 1935), esp. 96–97, and idem, *The Mosaics of San Marco*, I, II (Chicago, 1984), 291–94; 220–22. For the Baptistry at Florence, see R. Davidsohn, *Forschungen zur ältesten Geschichte von Florenz*, I, IV (Berlin, 1896–1908) 34 ff; 126, 461 ff, and idem, *Geschichte von Florenz*, I (Berlin, 1896–1927), 671 ff, 738–40. The few documents for the now-lost Trecento mosaics on the

the eighteenth century and of L. Fumi a hundred years later.<sup>3</sup> However, the communal registers and cathedral account books present detailed evidence about virtually every phase in the production of the mosaics between 1321 and ca. 1390. A selection of documents, many of which are published here for the first time, appears below in the Appendix.

The Orvieto documents emphasize that mosaic production was an expensive, labor-intensive process, and they lend valuable support to the idea that medieval mosaics were costly to produce.<sup>4</sup> In fact, the mosaics at Orvieto cost over four times as much per annum as similar work in fresco; an average of seven workers were required for the former as opposed to three for the paintings, and the overall cost of materials and transport for the mosaics was, understandably, much higher.

In the light of this evidence about the costliness of mosaic, our understanding of the aspirations of the Orvietani, the Normans in Sicily, or even the

facade of Siena cathedral are published by G. Milanesi, *Documenti per la storia dell’arte Senese*, I (Siena, 1854), 161; see also V. Lusini, *Il Duomo di Siena*, I (Siena, 1911), 223–42.

<sup>3</sup>G. della Valle, *Storia del Duomo di Orvieto* (Rome, 1791) and L. Fumi, *Statuti e Regesti dell’Opera di Santa Maria di Orvieto* (Rome, 1891). A larger selection of documents is found in Fumi, *Duomo*. The following are useful surveys of Orvieto at the time of the cathedral’s construction: D. Waley, *Medieval Orvieto* (Cambridge, 1952); E. Carpentier, *Orvieto: Une ville devant la Peste* (Paris, 1962) and idem, *Orvieto à la fin du XIII siècle* (Paris, 1986).

<sup>4</sup>C. Harding, “The Economic Considerations of Art: Mosaic versus Wall Painting in Renaissance Tuscany,” in *Festschrift for Nicolai Rubenstein*, ed. C. Elam and P. Denley (London, 1988). I. Andreescu, “La mosaïque murale: Histoire des restaurations, évolutions de ses techniques,” *Mosaïque, détérioration et conservation* (Rome, 1977), 17–33, esp. 17, comments that mosaic was a “status symbol” in the Middle Ages. Mosaic continued to be seen as an expensive, labor-intensive medium during the Renaissance, according to M. Wackernagel, *The World of the Florentine Renaissance Artist*, trans. A. Luchs (Princeton, 1980), 27.

Medici in Florence takes on new meaning.<sup>5</sup> During the Middle Ages, and to a lesser degree in the Renaissance, the medium of mosaic was highly esteemed for its impression of splendor and opulence, particularly when gold, silver, and other precious materials were used.<sup>6</sup> For instance, the decision to use mosaic rather than wall painting in the Baptistery at Florence during the thirteenth century was undoubtedly prompted by a desire to impress the neighboring towns in Tuscany, the mosaic-lining of the vaults literally "outshining" and perhaps even "outpricing" all other schemes of decoration in the region.<sup>7</sup> In a similar manner, great splendor and richness of texture were achieved at Orvieto cathedral by its golden facade mosaics and by the reliefs at its base which were once treated to resemble alabaster.<sup>8</sup>

### I. DATING AND SUBJECT MATTER OF THE MOSAICS

Records for the early history of Orvieto cathedral are extremely sparse. The first reference dates to 1284, with the agreement to construct a new church dedicated to the honor of the Blessed Virgin, the Assunta.<sup>9</sup> Many of the subsequent entries between this date and 1321 had apparently been lost by the late nineteenth century; these are

<sup>5</sup>Useful discussions of the mosaics in Sicily are found in O. Demus, *The Mosaics of Norman Sicily* (London, 1950) and E. Kitzinger, *The Mosaics of Monreale* (Palermo, 1960). The Medici interest in mosaic is examined by Wackernagel, *Renaissance Artist*, 27, 166, 256.

<sup>6</sup>Cf. J. Beckwith, "Byzantium: Gold and Light," in *Light in Art*, ed. T. Hess and J. Ashbery (New York-London, 1971), 67–81. For attitudes in the West, see E. Panofsky, "Abbot Suger of St. Denis," in his *Meaning in the Visual Arts* (Garden City, N.Y., 1957), 108–45.

<sup>7</sup>The competitive tendency between Tuscan towns is discussed by D. Waley, *The Italian City-Republics*, 2nd ed. (London, 1978), 87–93. H. Wieruszowski, "Art and the Commune at the Time of Dante," in her *Politics and Culture in Medieval Spain and Italy* (Rome, 1971), 475–502, esp. 493–96, suggests that the mosaics were commissioned so that the Florentines might appear more "aristocratic" in the Tuscan region. According to C. Harding, *Facade Mosaics of the Dugento and Trecento in Tuscany, Umbria, and Lazio*, diss. (London, 1984), 205–7, the choice of medium was probably intended to enhance their prestige.

<sup>8</sup>Working procedures for the reliefs are discussed by J. White, "The Reliefs on the Facade of the Duomo in Orvieto," *JWarb* 22 (1959), 254–302. M. Taylor, *The Iconography of the Facade Decoration of the Cathedral at Orvieto*, diss. (Princeton, 1970), examines the role of both sculpture and mosaic in the design of the facade. Two valuable studies by the same author focus on the Tree of Jesse reliefs, idem, "The Prophetic Scene in the Tree of Jesse at Orvieto," *ArtB* 54 (1972), 403–17, and idem, "A Historiated Tree of Jesse," *DOP* 34–35 (1980–81), 125–76. The alabaster-like covering of the reliefs was observed during the course of a recent restoration campaign. This information was kindly supplied by John White.

<sup>9</sup>Fumi, *Duomo*, 175–76.

known to us today only through G. della Valle's excerpts and paraphrases of the records.<sup>10</sup> In addition, the treasury books of the Opera del Duomo, a major source for the history of the cathedral, have only been preserved since 1321.<sup>11</sup> However, the surviving documentation provides a reasonably detailed picture of how work progressed on the facade.

The Sienese architect Lorenzo Maitani was taken on as *capomaestro* at the cathedral on 16 September 1310. The decoration of the facade is specifically mentioned in his contract, and he was probably asked by the authorities to submit a design for this area of the building.<sup>12</sup> In fact, one of the two surviving fourteenth-century drawings of the facade (the tricuspidal design) has been almost universally attributed to this master.<sup>13</sup> Both drawings, now in the Museo dell'Opera del Duomo at Orvieto, indicate that some form of master plan was drawn up in the initial planning stages of the cathedral exterior, and that fields of narrative mosaics were envisaged from the start (Figs. 2, 3). A representation of the coronation of the Virgin may be seen in the upper gable of the "first" or monocuspidal drawing (Fig. 2). While the "second" or tricuspidal drawing by Maitani does not indicate the subject matter of each of the gables, it is evident that more space was devised for the mosaics at some point during the planning process (Fig. 3). The iconographic program had therefore been established well before work actually began on the mosaics during the late 1350s.

The mosaics depict principal episodes in the life of the Virgin Mary. The Annunciation to Anna, the Birth of the Virgin, her Presentation in the Temple, and Marriage to Joseph are presented in the lateral gables, while her ascent from earth and triumph in heaven are emphasized by the compositions of the Assumption and Coronation on a central vertical axis (Figs. 1, 9–13).<sup>14</sup> The only de-

<sup>10</sup>Della Valle, *Storia*.

<sup>11</sup>That work has already begun some years before on the architectural mosaics is suggested by Ramo da Paganello's journey from Naples to Orvieto in 1314 to obtain skilled craftsmen as well as marble and mosaic for the palace of Bartolommeo da Capua. See E. Bertaux, *Santa Maria di Donna Regina e l'arte senese a Napoli nel secolo XIV* (Naples, 1899), 119, note.

<sup>12</sup>Fumi, *Duomo*, 21, Document I.

<sup>13</sup>White, "Reliefs," 273, describes them as the "first" and "second" drawings without temporal implication and dates them between 1310 and 1330. Taylor, *Facade Decoration at Orvieto*, 25–46, discusses further their authorship and sequence.

<sup>14</sup>A similar use of the central vertical axis is found in the oculi at Siena cathedral. For the Siena oculi, see E. Carli, *Vetrata ducessa* (Florence, 1946), and J. White, *Duccio: Tuscan Art and the Medieval Workshop* (London, 1979), 137–40.

violation from the traditional Marian cycle occurs in the mosaic of the Baptism of Christ displayed in the lower left-hand gable: its inclusion in the cycle may be explained by the fact that there was no separate baptistery at Orvieto, and the scene must be connected with the baptismal font situated just inside the church near the left doorway (Fig. 9).

From approximately 1321 to 1345, the architectural members of the facade were inlaid with decorative mosaic patterns, and during an almost contemporary period, the windows of the choir were completed (1325–34).<sup>15</sup> Unfortunately, while the archival evidence does provide some information on the sequence of work on the facade, it is not always possible to establish which narrative mosaic was being worked on at a specific time. The glass-maker Giovanni di Bonino, for example, may have commenced work on the lower zone of the facade in 1345, but the records do not mention which mosaic he was employed to make (Documents 9, 10).<sup>16</sup> Work began in earnest in 1359 with Orcagna's mosaic of the Baptism.<sup>17</sup> The compositions of the Nativity and Annunciation to Anna may date to 1362 and the years immediately thereafter.<sup>18</sup> The mosaic of the Assumption of the Virgin above the central doorway of the cathedral still bore the date of 1366 during the late nineteenth century (Fig. 11).<sup>19</sup>

The next level of the facade had been reached by the 1370s. The present composition of the Presentation of the Virgin to the right of the rose window bears the signature of the mosaicist Pietro Pucci and a date of 1376, although it has been subjected to restoration at least since the seventeenth century (Fig. 12).<sup>20</sup> The mosaic of the Marriage of the Virgin on the left-hand upper gable may also date from the late fourteenth century, but it is not specifically mentioned in any of the sources before the late Quattrocento; the present work is datable to the seventeenth century.<sup>21</sup> Most of the mosaics were therefore complete by 1390, apart from the Coronation of the Virgin in the crowning gable,

which was not completed until much later (Fig. 13).<sup>22</sup> Thus, despite the almost continuous history of restoration of these works, the present subject matter of each composition seems to reflect the original program carried out in the Trecento.

## II. STRUCTURE OF THE OPERA DEL DUOMO

As in most medieval Italian towns, the construction of Orvieto cathedral was undertaken as a public building program, in this case controlled by officials elected by the Commune.<sup>23</sup> A document of 25 June 1315 indicates that the office was administered by a treasurer, or *camerlengo*, and four supervisors (*operai*) from the principal neighborhoods of the town elected by governmental officials for six-month terms at a time; this arrangement apparently continued at Orvieto throughout the Trecento.<sup>24</sup> These individuals supervised every aspect of the cathedral's construction including the finances, purchase and production of building materials, and management of the many artists and artisans, such as stonecutters, masons, carpenters, blacksmiths, glaziers, roofers, and laborers. The day-by-day direction of the building was left in the hands of *capomaestri* like Lorenzo Maitani or Orcagna, who coordinated the activities of the different groups of craftsmen. The workers on the mosaics, for instance, included one or two mosaicists, several glassmakers (both types of worker had assistants), and the team of glass cutters who made the various sizes and shapes of tesserae.

The treasurer was directly responsible for administering the funds for construction, and two copies of treasury notebooks, known as the *Camerarii* registers, were kept by a notary together with any other records, such as memoranda or prelim-

<sup>22</sup>Ibid., 112, 114. The first decoration in the gable documented between 1450 and 1587 featured a Resurrection of Christ; this was replaced by the composition of the Coronation in the 18th century, in an attempt to return to the original concept of the program.

<sup>23</sup>A useful discussion of Italian construction projects is found in R. Goldthwaite, *The Building of Renaissance Florence* (Baltimore, 1980), 90–94.

<sup>24</sup>The history of the Opera to 1349 is examined by L. Riccetti, *Prezzi, salari, orari di lavoro nella fabbrica del Duomo di Orvieto (1347–1349)*, tesi de laurea (Florence University, 1985), 62–103, who kindly permitted consultation of his thesis. For the Opera del Duomo in Florence during the Trecento, see C. Guasti, *Santa Maria del Fiore* (repr. of 1887 ed., Florence, 1974). For the Sienese Opera del Duomo, which resembled that at Orvieto, see A. Middeldorf Kosegarten, *Sienesische Bildhauer am Duomo Vecchio: Studien zur Skulptur in Siena, 1250–1330* (Munich, 1984), 15–20.

<sup>15</sup>The documents for the windows are published by Fumi, *Duomo*, 215 ff. Giovanni di Bonino's work on the windows at Orvieto is discussed and illustrated in G. Marchini, *Le vetrate dell'Umbria*, Corpus Vitrearum Medii Aevi, Italia I: Umbria (Rome, 1973), 167–92.

<sup>16</sup>Fumi, *Duomo*, 121, Documents, XXXVIII, XXXIX.

<sup>17</sup>For the work of Andrea di Cione (known as Orcagna) at Orvieto, see R. Offner, *Andrea Orcagna*, in *A Corpus of Florentine Painting*, IV, I (New York, 1962), 4 ff, 13–19.

<sup>18</sup>Fumi, *Duomo*, 129–32.

<sup>19</sup>Ibid., 107.

<sup>20</sup>Ibid., 163 ff.

<sup>21</sup>Ibid., 144–59.

inary contractual agreements, in the Opera's offices. All contractual agreements had to be approved at town council meetings, hence the location of the *Riformanze* records in the State archive.

As in almost all medieval accounts, the cost of materials and wages were kept distinct; the expenditure on supplies, such as paper, glass or pigments, is set out in minute detail.<sup>25</sup> The records indicate that a host of different suppliers came and went with construction materials.<sup>26</sup> The volume of glass required after 1360, for example, resulted in Opera officials purchasing large quantities of earth, bricks, and coloring agents from suppliers traveling between Orvieto and the nearby towns of Monteleone, Arezzo, Piegara, and Casaglia, as exemplified by Documents 30, 32.<sup>27</sup>

Certain individuals, such as the glassmakers, were able to establish favorable working conditions that included a contract of supply. They were paid according to the amount of glass they produced, and their product was bought from them on Saturdays.<sup>28</sup> Onsite glassmakers, like the mosaicists, were provided with the additional benefit of lodgings and some bedding. Other suppliers operated on a more casual basis, as indicated by the example of Donnino of Florence, when he supplied the Opera with some glass and blue for the mosaics on two separate occasions.<sup>29</sup>

The working conditions of each type of worker are directly reflected in the account books. In contrast to the evidence from other building projects in Tuscany, workers at Orvieto cathedral were provided with tools for their work; the documents discussed below regarding tools for the master glassmakers are of particular interest.<sup>30</sup> Unskilled or semiskilled artisans, such as the glass cutters, were normally paid by the day or on a piece-work basis (*a cottimo*).<sup>31</sup> They received their pay once a week, usually on Saturdays, in the local currency of the denarius of Cortona. The more highly skilled artists, such as metalworkers or mosaicists, were paid

a monthly rate, usually in Florentine florins.<sup>32</sup> These individuals apparently enjoyed positions of considerable responsibility, and they were often sent throughout Italy to purchase materials for the cathedral. Between 1360 and 1364, for instance, the mosaicist Fra Giovanni Leonardelli went to Siena, Bolsena, and Venice for supplies, as well as working on the cathedral's windows and mosaics (Documents 19, 43, 46, 52–54).<sup>33</sup>

### III. MATERIALS FOR THE MOSAICS

As the documents present a continuous history from 1321 for the production of materials for the mosaics, this aspect is examined here first; detailed records for the organization of the workshops begin only in 1359.

#### *The Glass Furnaces*

In 1321 a team of men under the Opera del Duomo's direction built a furnace at Orvieto to manufacture the glass tesserae for the architectural members.<sup>34</sup> Several months later, we learn that the glassmakers Consilio of Monteleone and Ghino Petri were working "at the glass furnaces situated opposite the door of the bishop's palace of the city of Orvieto" (Document 1). In fact, a number of small workshops and a lime-kiln were situated in the immediate vicinity of the cathedral.<sup>35</sup> The fifteenth-century illustration of the small eastern European forest glassworks from Sir John de Mandeville's *Travels* demonstrates the simplicity of the buildings required for a medieval glass furnace (Fig. 4), reminding us that the furnace at Orvieto need not have been much more elaborate.<sup>36</sup>

Opera officials patronized glassmakers in the nearby districts of Monteleone and Piegara in the first half of the fourteenth century, but the evi-

<sup>25</sup> Cf. the evidence from England in *The Age of Chivalry*, ed. J. Alexander and P. Binski (London, 1987), 393.

<sup>26</sup> Riccetti, *Fabbrica del Duomo*, 109–27.

<sup>27</sup> For a map illustrating the various sources of supply for the Opera del Duomo, see *ibid.*, fig. 5.

<sup>28</sup> Tuscan contracts of supply are discussed by Goldthwaite, *Renaissance Florence*, 157–59.

<sup>29</sup> The payment on 30 October 1359 to Donnino for supplying over fourteen pounds of blue is published in Offner, *Corpus*, 14. See below, Document 17, for his purchase of glass in Venice.

<sup>30</sup> Goldthwaite, *Renaissance Florence*, 293. See below, "Tools for the Mosaic Workers."

<sup>31</sup> A comparable arrangement was in operation in Florence; see Goldthwaite, *op. cit.*, 292.

<sup>32</sup> P. Spufford, *Handbook of Medieval Exchange Rates* (London, 1986), 59, provides a list of exchange rates in Orvieto for the following years only: 1321–32, 1348–49, 1361.

<sup>33</sup> See also Fumi, *Duomo*, 124, 133, Documents, LXIII, CII.

<sup>34</sup> *Ibid.*, 117, Document I. The construction of a medieval glass furnace is described by Theophilus in *On Divers Arts: The Treatise of Theophilus*, ed. J. G. Hawthorne and C. S. Smith (Chicago, 1963), which is the edition used here. A history of furnaces is given in R. J. Charleston, "Glass Furnaces through the Ages," *Journal of Glass Studies* 20 (1978), 9–33. For a late 14th-century source describing glass furnaces, see *De la pratica di comporre finestre a vetri colorati, trattatello del secolo XV, edita per la prima volta*, ed. L. Lazzari (Siena, 1886), repr. in A. Lisini, "De la pratica di comporre finestre a vetri colorati," *La Diana* 5 (1930), 261–90. V. Lazarev, *Old Russian Murals and Mosaics* (London, 1966), 16–18, discusses the on-site furnace for Russian mosaics.

<sup>35</sup> Riccetti, *Fabbrica del Duomo*, 127.

<sup>36</sup> The illustration is reproduced here with the kind permission of the Trustees of the British Library, B.M. Add. Ms.



dence for the purchase of window glass and tesserae at these locations, especially Monteleone, is more abundant after 1360; no doubt this reflects an increase in the volume of glass required for the windows and narrative mosaics (Documents 7, 42, 43, 50, 54, 74–76, 91). The furnace near the cathedral site was also rebuilt and maintained during this period (Documents 32, 33). The need to produce sufficient glass for these decorative schemes, as well as the continual demand for a convenient supply of firewood and raw materials for glass-making, must have favored these additional trade links with glassworks in the *contado*.<sup>37</sup>

None of the documents refer to the purchase of raw materials intended specifically for the glass, such as sand or potash, indicating that the glass-makers, and not the Opera, were responsible for the purchase of these goods. This is confirmed in a contract of 1362 with the master glassmaker, Andrea Nelli Zampino, which stipulates that he is to manufacture the mosaic tesserae at his own expense.<sup>38</sup> Other materials for the glass, such as frit, were acquired in the neighboring town of Piegara (Document 32). This was placed in the furnace in a type of Aretine ware referred to as *christonchis* on at least one occasion, and the documents record the purchase of yellow earth from Arezzo and Casaglia to make vases “to cook the glass,” as, for example, in Documents 29, 32.<sup>39</sup>

A rather unusual payment was made in 1361 for *christalli*, and the document states that it was to be mixed with the colors for the mosaic (Document 36). However, the slightly higher costs for soda, or crystal glass, over that made primarily from potash (and the fact that it is only mentioned once in the records), suggest that its addition to the batch was not common practice at Orvieto.<sup>40</sup> It was probably used on this occasion to help purify the glass.

Coloring agents for the glass are mentioned repeatedly in the records. For over seven decades, the Opera purchased quantities of metallic oxides

to produce the various colors of glass required by the mosaicists, as exemplified by Documents 8, 30.<sup>41</sup> Although the documents state that the glass-makers had to produce the tesserae at their own expense, Opera officials requested a separate accounting for the color blue, a situation paralleled in arrangements made with painters and other craftsmen during this period.<sup>42</sup> On those occasions when this pigment could not be found in Florence, Siena, or Perugia, the treasurer was obliged to search for it at the Opera's expense.<sup>43</sup> Another entry mentions that a coarse grade of blue, *azzurro grosso*, was used for the mosaics, and this too may have been a coloring agent for the tesserae (Document 82).

The documents make frequent references to the acquisition of fuel, although they do not always mention which furnace it was intended for. Fortunately, several entries make a more detailed reference to this very necessary aspect of mosaic production. One document of 27 January 1334 reveals that a supplier was paid for wood to “cook the glass for the windows,” and the other (24 December 1360) indicates that a laborer spent three days chopping wood for the glass furnace (Document 33).<sup>44</sup> A survey of the Opera's expenditure on fuel between 1347 and 1349, however, revealed that large amounts of charcoal rather than wood were purchased in the nearby district of Alleronia.<sup>45</sup> Over a decade later, at least one *salma* of charcoal was bought for the glasshouse (Document 32). The supply of wood and charcoal mentioned in these records was seemingly destined for the on-site glass furnace, while the *contado* glasshouses must have provided their own fuel.

#### *Tools for the Mosaic Workers*

The documents reveal that an extensive range of tools was made by the Opera's blacksmith Giovanni Micchilutii for the mosaic workers. He produced scalpels, large and small hammers, a cutting tool

24188, fol. 16, Sir John de Mandeville's *Travels*. It may illustrate the production of glass products in a Bohemian glassworks.

<sup>37</sup> Forest glasshouses are discussed by A. Polak, *Glass, Its Traditions and Its Makers* (New York, 1975), 35 ff. See also D. B. Harden, “Glass and Glazes,” in *A History of Technology*, ed. C. Singer et al., II (Oxford, 1954–58), 311–46, and R. J. Charleston and L. Angus-Butterworth, “Glass,” also in Singer, *Technology*, III, esp. 209–16.

<sup>38</sup> Fumi, *Duomo*, 128, Document LXXXIV.

<sup>39</sup> Ibid., 126, Document LXXII. The shape of vessels used in medieval furnaces in England is illustrated in G. H. Kenyon, *The Glass Industry of the Weald* (Leicester, 1967), figs. 1–3a.

<sup>40</sup> Ibid., 37, for the higher cost of crystal glass in England; see also Polak, *Glass*, 11–17.

<sup>41</sup> G. Milanese, *Dell'arte del vetro per mosaico* (Bologna, 1864), publishes an edition of three 14th- and 15th-century Tuscan treatises on glass. For another valuable Trecento source, see R. Bruck, “Der Tractat des Meisters Antonio da Pisa über die Glasmalerei,” *RepKunst* 25 (1902), 240–69. Two recent studies include I. F. Roncuzzi, *Arte e tecnologia del mosaico* (Ravenna, 1971), and R. G. Newton, “Colouring Agents Used by Medieval Glass-makers,” *Glass Technology* 19 (1978), 56–60, although I was unable to consult the latter.

<sup>42</sup> Wackernagel, *Renaissance Artist*, 327, 340.

<sup>43</sup> As in note 38 above.

<sup>44</sup> Fumi, *Duomo*, 216, Document xxxiv.

<sup>45</sup> Riccetti, *Fabbrica del Duomo*, 116–17, 123–24, discusses the purchase of fuel for the lime-kiln and foundry near the cathedral.

described as a *rasoio*, and anvils, all of which were used to cut the tesserae into the required shapes and sizes (Documents 25, 27, 40, 79). He also manufactured and maintained most of the tools traditionally used in glassblowing, such as blowpipes, shears, ladles, forks, metal planes to flatten the glass, a pontil, and the *pappatoio*, a long-handled implement used to manipulate the frit in the furnace (Documents 31, 33, 40, 41). Although from a later period, Haudicoeur de Blancourt's *The Art of Glass* demonstrates the wide range of tools used for glassmaking in the seventeenth century.<sup>46</sup> As the design of this equipment did not change dramatically over the centuries, it seems likely that some of the tools at Orvieto resembled those illustrated in the latter (Fig. 5).<sup>47</sup>

A contract of 1362 indicates that the Opera helped the master glassmaker Consilio of Monteleone set up his workshop, supplying him with a cash advance of ten florins, a plane, a fork, an iron "for cutting," the marvering slab used to shape molten glass, and a *carrega*, perhaps the earliest-documented reference to the seat or chair used in glassmaking (Document 42).<sup>48</sup> Another document mentions the acquisition of a mortar of metal weighing nineteen and a half pounds "for the crushing and grinding" of the glassmakers' colors (Document 11). The Opera furthermore paid Giovanni to make various trowels to lay the mortar of the setting bed (Documents 6, 25), and he provided large quantities of iron nails and clamps, which were presumably used to reinforce the tops of the gables, as occurred at other mosaic projects (Documents 6, 25, 31, 33, 79, 88).<sup>49</sup>

#### *Production of the Tesserae*

Treatises such as Theophilus' *De Diversis Artibus* provide valuable information of the manufacture of glass tesserae in the Middle Ages, and this is perhaps the best-understood phase of mosaic production as a result.<sup>50</sup> It appears that the glassmakers at Orvieto followed the procedures outlined by

Theophilus. He tells us that tesserae were prepared as follows: molten glass was first blown and shaped on the marvering slab, reheated and then formed into cylindrical shapes, which were cut lengthwise and opened out into sheets of glass. These were then transferred to the annealing chamber in the furnace, where they were heated very slowly and allowed to flatten under their own weight, aided by a smoothing block; the glass was later cut into the appropriate shapes and sizes for mosaic work. This method, known as the "muff" technique, was also used to make window glass.<sup>51</sup> The evidence from other medieval mosaic cycles, however, suggests that glassmaking procedures varied considerably from site to site; tesserae were sometimes also cast as thin, flat cakes of glass and then subdivided.<sup>52</sup>

The "muff" technique was apparently used by glassmakers at Orvieto, as suggested by the many payments for blowpipes and the smoothing block. The first clear indication of this occurs in a document of 1321, when Consilio was paid for a "pierced rod of iron for blowing glass to place over leaves of beaten gold" (Document 1). In 1362 the metalworker Matteo di Bononia was paid for the manufacture of a metal plane: "for flattening the glass for the gold" (cf. Documents 41, 44). At the same time, Consilio was paid for a piece of marble to smooth the gold glass, which is referred to later in the same record as "the marver" (Document 42). The need to manufacture enough glass both for the windows and the mosaics may have encouraged glassmakers at Orvieto to use the "muff" technique, simply because it was the quickest, most efficient method of production for either purpose; indeed, it became increasingly common during the late Middle Ages to produce sheets of glass in this manner.<sup>53</sup>

Theophilus also tells us that gold or silver tesserae were manufactured by placing precious foil leaves on cakes or sheets of glass, which were then

<sup>46</sup>Fig. 5 is based on J. Haudicoeur de Blancourt, *The Art of Making Glass* (London, 1699), pl. facing p. 30.

<sup>47</sup>Cf. the illustrations in "Verrerie," *Encyclopédie ou dictionnaire raisonné des sciences des arts et des métiers*, ed. J. Diderot and J. Le R. D'Alembert, X (Paris, 1765), pls. xvii-xviii, and A. Neri, *L'arte vetraria* (Amsterdam, 1668), 449.

<sup>48</sup>For the significance of the chair, see Singer, *Technology*, III, 219-20.

<sup>49</sup>Cf. the evidence outlined by D. Mouriki, *The Mosaics of Nea Moni at Chios* (Athens, 1985), 95.

<sup>50</sup>The authorship of the treatise is examined in *On Divers Arts*, ed. Hawthorne and Smith, xv-xvii.

<sup>51</sup>*Ibid.*, 60. For a discussion of the "muff" technique, see J. Mellentin-Haswell, *Van Nostrand Reinhold Manual of Mosaic* (London, 1973), 67-68.

<sup>52</sup>R. J. Charleston, "Glass 'Cakes' as Raw Material and Articles of Commerce," *JGS* 5 (1963), 54-67, claims that similar cakes of glass were sold for making mosaics but unfortunately does not give any documentary reference for this statement. The evidence from other locations indicates a different means of glass production: A. H. Megaw, "Notes on Recent Work of the Byzantine Institute in Istanbul," *DOP* 17 (1963), 349-67, notes that the stained glass from the Zeyrek Camii, Istanbul, was cast and not produced by the "muff" technique, as were the Venetian *languae* discussed below, note 56.

<sup>53</sup>Kenyon, *Glass Industry*, 86.

covered with a thin film of ground glass.<sup>54</sup> This layer was later fired in the furnace, with the result that the gold was “sandwiched” between two protective layers of glass. The Orvietan documents repeatedly stipulate that the gold leaf was to be placed between two layers of glass when these tesserae were manufactured, and the color of the base layer (red) is sometimes indicated (Documents 7, 42, 43, 50).<sup>55</sup> The terminology of the documents is suggestive of the shape of glass sheets used for the gold tesserae: they are referred to as *linguae* or “tongues” of glass. The fortunate survival of two twelfth-century *linguae* found beneath the floor of San Marco, Venice, illustrates this shape, although these appear to be cast rather than blown glass.<sup>56</sup>

Once the *linguae* were prepared, it was then necessary to cut them into tesserae. The Orvietan documents mention a cutting tool—the *rasoio*—on several occasions, and this must be the medieval equivalent of the glass cutter (Documents 31, 42). Theophilus describes an “iron cutting tool, which should be thin everywhere but at the end, where it should be thicker.”<sup>57</sup> The thicker part of the iron was to be red-hot and used to make a small groove in the glass to establish the line of fracture. He adds: “if the glass be hard, wet it with saliva on your finger in the place where you placed the iron. It will immediately split and, as soon as it has, draw the tool along the line you want to cut and the split will follow.”<sup>58</sup> Once the line of fracture had been established, the underside of the glass could be simply tapped with the glass cutter, and a strip or piece of glass would break off along this line.

The natural materials used in the mosaics at Orvieto, such as marble, stone, and pieces of terracotta, may have been fractured on a type of *hardie*, or chisel affixed to a block of wood, as described in recent manuals on mosaic production; a hammer was then used to hit the material from above.<sup>59</sup> Although the documents do not specifically mention a chisel of this description, the same principle must have been followed at Orvieto, as suggested by the payments for hammers and anvils to be used by the *incisores vitri* (Documents 25, 79). The docu-

ments pertaining to the apse mosaic at Pisa cathedral also mention the use of hammers to cut up stone and glass.<sup>60</sup>

### *Supplies and Suppliers*

The first entries in the Orvietan registers record the purchase of materials for the tesserae of the architectural elements.<sup>61</sup> The Opera acquired large quantities of gold and silver leaf, and approximately one month after the furnace was built in 1321, the goldsmith Pucio Locti was “placing gold leaf on glass” worked at the glass furnace (Document 2).

The supply of gold and silver often came from neighboring towns, such as Siena or Spoleto, although there was a small goldworking industry in Orvieto (Documents 2, 43, 52, 53).<sup>62</sup> The Orvietan documents mention numerous payments for special messengers who carried letters to the *battilori* and other merchants in the region.<sup>63</sup> Several entries refer to Fra Giovanni’s trip to Siena in 1364, when he acquired supplies for the Opera. In addition to lead came for the windows, he purchased gold leaf for the tesserae, which he had beaten and placed in a paper notebook; he was required to collect the gold upon his departure from Siena (Documents 52, 53).

At the same time in 1321 Opera officials began to purchase quantities of *ciangule* and *piastrelle* or “tiles” of glazed terracotta and pottery for use in the architectural members; similar materials were later bought for the narrative mosaics, as indicated in Document 47.<sup>64</sup> Presumably, the use of these “tiles” helped to check the overall costs of production; similar pieces of terracotta and pottery are commonly found in Byzantine and other Western medieval mosaics.<sup>65</sup>

Following Orcagna’s arrival at Orvieto in 1359, several people were sent to Venice to acquire glass for the mosaics, perhaps of a special color or quality.<sup>66</sup> For instance, Donnino of Florence, an independent supplier to the project, was given a “shopping list” for the purchase of glass in Venice, which had been drawn up by Orcagna and an Opera of-

<sup>54</sup> *On Divers Arts*, ed. Hawthorne and Smith, 60–61.

<sup>55</sup> Cennino d’Andrea Cennini, *The Craftsman’s Handbook*, trans. D. V. Thompson (New York, 1960), 79–80, instructs artists to use red bole under gold leaf in panel painting and manuscript illumination.

<sup>56</sup> These *linguae*, which were probably produced locally, are illustrated in *Mille anni di arte nel vetro a Venezia*, ed. R. B. Menzies et al. (Venice, 1982), 64, figs. 30 and 31.

<sup>57</sup> *On Divers Arts*, ed. Hawthorne and Smith, 62–63.

<sup>58</sup> *Ibid.*

<sup>59</sup> Mellentin-Haswell, *Mosaic*, 51.

<sup>60</sup> See Trenta, *Mosaici*, 85.

<sup>61</sup> Fumi, *Duomo*, 117–18.

<sup>62</sup> Carpentier, *Orvieto*, 185, 261, cites the documentary evidence for goldsmiths at work in Orvieto during this period.

<sup>63</sup> Fumi, *Duomo*, 117.

<sup>64</sup> *Ibid.*, 117–19, for the early documentation.

<sup>65</sup> Mouriki, *Nea Moni*, 101.

<sup>66</sup> See, for instance, Fumi, *Duomo*, 123–24, Documents LIV, LXIII.

ficial. Donnino was required to fill two panniers with the following quantities of glass: 100 pounds (*libbre*) of gold, 5 shades of blue (100 pounds), 5 shades of *laccha*, a type of red (50 pounds), 5 shades of violet (50 pounds), 5 shades of green (50 pounds), 5 shades of vermilion (50 pounds), 50 pounds of white, 5 shades of yellow (50 pounds), 3 shades of *incarnazione* or flesh tone (50 pounds), 3 shades of *verdaccio* or green (50 pounds), 3 shades of black (30 pounds), and 30 pounds of silver, and transport this to Orvieto at his own expense, where it would then be bought from him, providing Orcagna was satisfied with his purchase (Document 17).<sup>67</sup>

This document is of particular interest. It illustrates the precise nature of a typical contract of supply, in which the *capomaestro* and Opera officials formulated a detailed set of instructions about the purchase of materials for the mosaics. Furthermore, it provides documentary confirmation of the recent hypothesis concerning the "palette" of Byzantine mosaics (i.e., the suggestion that either three or five shades of the various colors were used in Middle Byzantine mosaics), and it is surely significant that Donnino is asked to acquire precisely three or five shades of most colors.<sup>68</sup> Finally, the document demonstrates that Venice was still actively producing the necessary materials for mosaic work during the late 1350s.<sup>69</sup>

Natural stone is normally used by Byzantine and Western medieval mosaicists for certain areas of their work, such as the hands and faces of figures, and the mosaics at Orvieto are no exception to this rule. There are numerous payments for *quadrucci* or *chuochildi* of marble and stone after 1360 (Documents 30, 55, 63). Their use in "the flesh of the figures in mosaic" is recorded in the documents, and these may still be seen today in a much-damaged state in the Victoria and Albert mosaic (Figs. 6, 7) (Document 78).<sup>70</sup> During the 1360s the mosaicist Fra Giovanni purchased some as yet unidentifiable *lapides de Venetia* for the mosaics, which were white in color (Documents 45, 48).

The Orvietan documents record the purchase of materials for the mortar or *calcina* or the mosaic setting bed (Documents 13, 19, 58). Like that for frescoes, this was usually made with a large quantity of oil to prevent the mixture of marble dust, water, and other substances from drying out: the surface of the wall had to be well oiled to accommodate the rather slow work of setting the mosaics.<sup>71</sup> There are repeated payments for crushed red tiles to be used in the mortar at Orvieto; these were bought in towns such as Bolsena, as, for example, when Fra Giovanni was sent to buy tiles for the mortar (Document 19). The furnace for the mortar was erected in the piazza opposite the cathedral at least as early as 1348.<sup>72</sup> Several decades later, the Opera rented premises to one Bartolomeo di Cione for this purpose; these were located in the road leading to the church of San Francesco near the cathedral (Document 65).

A payment in 1385 records that ten bowls were bought to hold the colored tesserae; presumably, these were brought up on the scaffolding when the mosaicists were at work on the setting bed, and in the case of the wall paintings in the main apse, at least forty-four bowls were used at one time to hold the required pigments (Documents 60, 72, 84). One of the earliest surviving references to the scaffolding for the mosaics dates to 1348, when six chestnut planks were bought for its construction (Document 12). The scaffolding was often rearranged during the course of work over the next four decades, although the documents do not refer to its precise placement or size, as, for example, in Documents 38, 67. The mosaicists were given a number of mats, which were placed both on and around the framework for protection from the elements (Documents 20, 22); other mundane details include brooms and various bits of cloth for handling the glass (Documents 30, 88). Only one payment of the *gabella* was entered in the Orvietan records, on the export of tesserae from Piegara in 1386; materials for the cathedral were normally exempt from taxation (Document 91).<sup>73</sup>

A comparison of the means of supply to the other fourteenth-century mosaic projects in Italy suggests that a network of local suppliers was just

<sup>67</sup> This document was first published in its entirety by G. Milanesi, "Documenti dei lavori fatti da Andrea Orcagna nel Duomo d'Orvieto," *Giornale storico degli Archivi Toscani* 3 (1879), 106–8. The *libbra* or pound used at Orvieto during this period is equivalent to 34 grams according to Riccetti, *Fabbrica del Duomo*, 116, although this requires further verification.

<sup>68</sup> Mouriki, *Nea Moni*, 102.

<sup>69</sup> The mosaic cycles of the Baptistery and the chapel of San Isidoro in San Marco, Venice, are discussed by Demus, *Mosaiken*, 64, 99.

<sup>70</sup> Fumi, *Duomo*, 134, Document cviii.

<sup>71</sup> Ibid., 112, gives a recipe for the mortar which calls for quantities of linseed oil. Oil is also mentioned in the accounts for the Pisan apse mosaic; see Trenta, *Musaici*, 73 ff.

<sup>72</sup> The 1348 entry is discussed by Riccetti, *Fabbrica del Duomo*, 13 note 3.

<sup>73</sup> The exemption is discussed by Carpentier, *Orvieto*, 56 note 47.

as important elsewhere. The documents for the apse mosaic at Pisa cathedral, for instance, indicate that tesserae for this work were bought from local producers, although supplies were sometimes augmented by itinerant merchants, as occurred in the case of Bacciameo Jovenchi from Milan.<sup>74</sup> In Venice, *linguae di vitro* were produced nearby for the mosaics of San Marco: a document of 25 August 1308 authorized a glassmaker in Murano to reactivate his furnace during the summer months so that fifteen thousand pieces of glass could be manufactured for the mosaics of the basilica.<sup>75</sup>

The wealth of information presented in the Orvieto documents is immediately apparent when compared to the relatively sparse records for other Trecento mosaic schemes, such as the cycles at Pisa, Siena, Florence, and Venice, or even the inlaid decoration of Orcagna's tabernacle at Or San Michele.<sup>76</sup> As a result of their survival, we now possess a detailed picture of production conditions for at least one mosaic project in Italy.

#### IV. MOSAIC PRODUCTION AT ORVIETO: THE PREPARATORY STAGES

When work commenced on the mosaic of the Baptism in 1359, both drawings and underpaintings on the wall were apparently employed in the preliminary stages of creating the work, and the mosaicists worked directly on the wall. Until the late 1950s, it was thought that mosaics were created using the "indirect" method, in which tesserae were attached to a cartoon in the studio and then transferred to the wall.<sup>77</sup> While this method was often used for postmedieval mosaics, a survey of the unfinished mosaics of the Fethiye Camii in Istanbul led Byzantine scholars to revise their opinions in favor of the "direct" method, in which

artists painted the preliminary drawings and set the tesserae directly on the wall.<sup>78</sup> It is now generally agreed that both Byzantine and Western medieval mosaics were produced in this manner, and the mosaics at Orvieto are no exception to this rule. The order of work at Orvieto, however, ran contrary to that for other decorative schemes, with the mosaicists working up rather than down the facades, as was the norm for ceiling and vault mosaics elsewhere.

Mosaic setting beds normally consist of two or three layers of mortar, and the layers of lime plaster are laid on the surfaces of walls or vaults that are sometimes reinforced with iron nails; as noted above, nails and clamps were made to reinforce the mosaics at Orvieto.<sup>79</sup> The evidence from other mosaic projects indicates that preliminary compositional sketches were made on occasion, either on an earlier rendering coat or on the masonry itself.<sup>80</sup> Far more common, however, were the preparatory drawings painted directly on the setting bed, which guided the mosaicists in the setting of the tesserae.<sup>81</sup> Iconographic guides and motif books were also used in the early planning stages, or at times, detailed miniatures, as in the well-known example of the Cotton Genesis, which was probably used as a model for the atrium mosaics at San Marco.<sup>82</sup>

The Orvietan documents reveal an interesting and somewhat different approach to the preparatory stages of mosaic making. Beginning in 1359, when work began on the mosaic of the Baptism, the registers make numerous references to pigments that could have been used for drawing on the wall, such as sinoper, *terra verde*, and ochre, although underdrawings have never been observed here (Documents 28, 62, 64, 71, 77, 93). However, detailed sinopie have survived for the frescoes of

<sup>74</sup> Trenta, *Mosaici*, 73 ff.

<sup>75</sup> Demus, *Mosaiken*, 96, and idem, *San Marco*, II, 2, 221. Some of the materials were imported from Constantinople.

<sup>76</sup> For the documents pertaining to Orcagna's work on the tabernacle in Florence, see Offner, *Corpus*, 3 ff.

<sup>77</sup> Summarized by P. Nordhagen, "Mosaic," *New Encyclopedia Britannica*, 12 (15th ed., Chicago, 1976), 462–74, and E. Kitzinger, "Mosaic Technique," *Encyclopedia of World Art*, 10 (New York–Toronto–London, 1972), cols. 325–27. The following are particularly important for the study of mosaic technique: Kitzinger, *Monreale*, 64–68; C. Mango and E. J. W. Hawkins, "The Apse Mosaics of St. Sophia at Istanbul," *DOP* 19 (1965), 115–51; P. Nordhagen, "The Mosaics of John VII (705–707 A.D.)," *Acta IRNorv* 2 (1965), 121–66; P. Underwood, *The Kariye Djami* (New York, 1966–75); H. P. L'Orange and P. J. Nordhagen, *Mosaics* (London, 1966); E. J. W. Hawkins, "Further Observations on the Narthex Mosaics in St. Sophia in Istanbul," *DOP* 22 (1968), 153–55, 165–66; and Mouriki, *Nea Moni*, 94–106.

<sup>78</sup> Underwood, *Kariye Djami*, I, 179.

<sup>79</sup> For the composition of mosaic setting beds see Mouriki, *Nea Moni*, 95–96 and Lazarev, *Murals and Mosaics*, 18. For the nails and clamps at Orvieto, see above, "Tools for the Mosaic Workers."

<sup>80</sup> R. Oertel, "Wandmalerei und Zeichnung in Italien," *Mitteilungen des Kunsthistorischen Instituts in Florenz* 4–5 (1940), 221, 273–76; and F. Forlati, "La tecnica dei primi mosaici marciari," *ArtV* 3 (1949), 85–87. The evidence from Byzantium is found in D. Winfield, "Byzantine Wall Painting Methods," *DOP* 22 (1968), 63–139, and S. Young, "Relations between Byzantine Mosaic and Fresco Technique," *JÖB* 25 (1976), 269–78.

<sup>81</sup> U. Procacci, *Sinopie e affreschi* (Milan, 1961), pls. 2, 3, reproduces a sinopia for the 14th-century mosaics of the Baptistry in Florence. Although from an earlier period, an underdrawing at San Marco is illustrated in Demus, *San Marco*, II, 292, fig. 20.

<sup>82</sup> Kitzinger, *Monreale*, 64. For the Cotton Genesis, see the recent remarks by Weitzmann in Demus, *San Marco*, I, 291 ff.

the chapel of the Corporal (1357–64), and, together with the documents published here, it appears that some form of underpainting on the wall was used for the mosaics.<sup>83</sup>

There are, in addition, several payments for paper and glue to stick the sheets together, suggesting that preparatory drawings were used, either for contractual purposes or, as seems more likely, as cartoons or auxiliary drawings (Documents 18, 89). Both Orcagna and Fra Giovanni Leonardelli produced drawings for the mosaics, which have unfortunately not survived. On one occasion, Fra Giovanni was given a piece of parchment for “designing the figure of St. John the Baptist” in mosaic.<sup>84</sup> This type of drawing, which presumably featured a more highly finished study of individual figures and forms than would have been found in the underdrawings on the wall, was an important aid in the design process. It must have functioned as a detailed guide to the mosaicist, perhaps when he was at work on the scaffolding. One of the limitations of the underdrawing on the wall, of course, was that the composition was obscured as the *giornate* of the setting bed were laid; these drawings would therefore have been an invaluable reminder to the mosaicist as his preliminary sketches on the wall disappeared from view.

The use of these drawings, both on the wall and on paper or parchment, heralds a fundamental change in mosaic production. During the Renaissance, the practice of executing painted underdrawings on the setting bed was gradually abandoned, and extensive use was made instead of cartoons.<sup>85</sup> Titian or Tintoretto, for instance, usually prepared cartoons for the mosaics of San Marco, and gave them to an artisan who merely followed their designs, setting the tesserae in the plaster bed.<sup>86</sup> The separation between artist and craftsman thus became quite pronounced, partic-

ularly during the Cinquecento, and the arrangement of the tesserae was reduced to an almost mechanical procedure.<sup>87</sup> At the same time, mosaics became increasingly like “paintings made from stone.”<sup>88</sup> While there is abundant proof that the master mosaicists at Orvieto designed the mosaics and actually set the tesserae themselves, the increased use of cartoons and auxiliary drawings by these craftsmen points to the transformation of the art of mosaic making during the Renaissance.

#### V. ORGANIZATION OF THE MOSAIC WORKSHOPS AT ORVIETO

In 1960 E. Kitzinger claimed that a well-organized workshop under the strict leadership of a master mosaicist executed the mosaics at Monreale.<sup>89</sup> The evidence from Orvieto confirms this hypothesis of a hierarchical division of labor, with the master mosaicists and their assistants collaborating with master glassmakers employed by the Opera del Duomo. Documentary sources which might illuminate how mosaic workshops were organized during the Middle Ages are extremely limited, and the two most frequently cited pose particular problems of interpretation. It has recently been suggested that the first of these, Diocletian's Edict on Prices, has little relevance as regards the hierarchy of mosaic workshops in the Middle Ages.<sup>90</sup> The other surviving reference to the different individuals active in mosaic production dates from the Carolingian period: a manuscript in Leiden distinguishes between the *pictor*, who supervised the laying of the mortar and possibly the preparatory drawings on the wall, and the *artifex*, who set the tesserae in the plaster bed.<sup>91</sup> While this separation of artist and craftsman may have characterized workshop procedures at other times in the history of mosaic production, the evidence from Orvieto indicates otherwise, with master mosaicists executing preliminary underpaint-

<sup>83</sup> For a discussion of the chapel's sinopie and frescoes, see B. Zanardi, L. Rissotto, V. Ruesch, S. Vedovello, “Il distacco degli affreschi di Ugolino,” *Bollettino dell'Istituto Storico Artistico Orvietano* 34 (1978), 34–58, and idem, “Il distacco delle sinopie di Ugolino,” *ibid.*, 59–71.

<sup>84</sup> Fumi, *Duomo*, 125, Document LXVIII.

<sup>85</sup> Procacci, *Sinopie*, 19, states that sinopie were replaced by cartoons for monumental wall compositions around 1400. M. Muraro, “The Statutes of the Venetian *Arti* and the Mosaics of the Mascoli Chapel,” *ArtB* 43 (1961), 263–74, assumes that Quattrocento mosaicists used full-scale cartoons for their work. Cennini, *Craftsman's Handbook*, 111, writes of full-scale drawings on paper during the Trecento in connection with stained glass design. See also below, note 87.

<sup>86</sup> P. Saccardo, *Les mosaïques de St. Marc* (Venice, 1896), and Demus, *Mosaiken*, 69–72.

<sup>87</sup> For an important parallel with Florentine glaziers during this period, see E. van Straelen, *Studien zur Florentiner Glasmalerei des Trecento und Quattrocento* (Wattenscheid, 1938); A. Lane, “Florentine Painted Glass and the Practice of Design,” *ArtB* 91 (1949), 43–48; and G. Marchini, “Le vetrare,” *Antichità Viva* 26 (1987), 8–18.

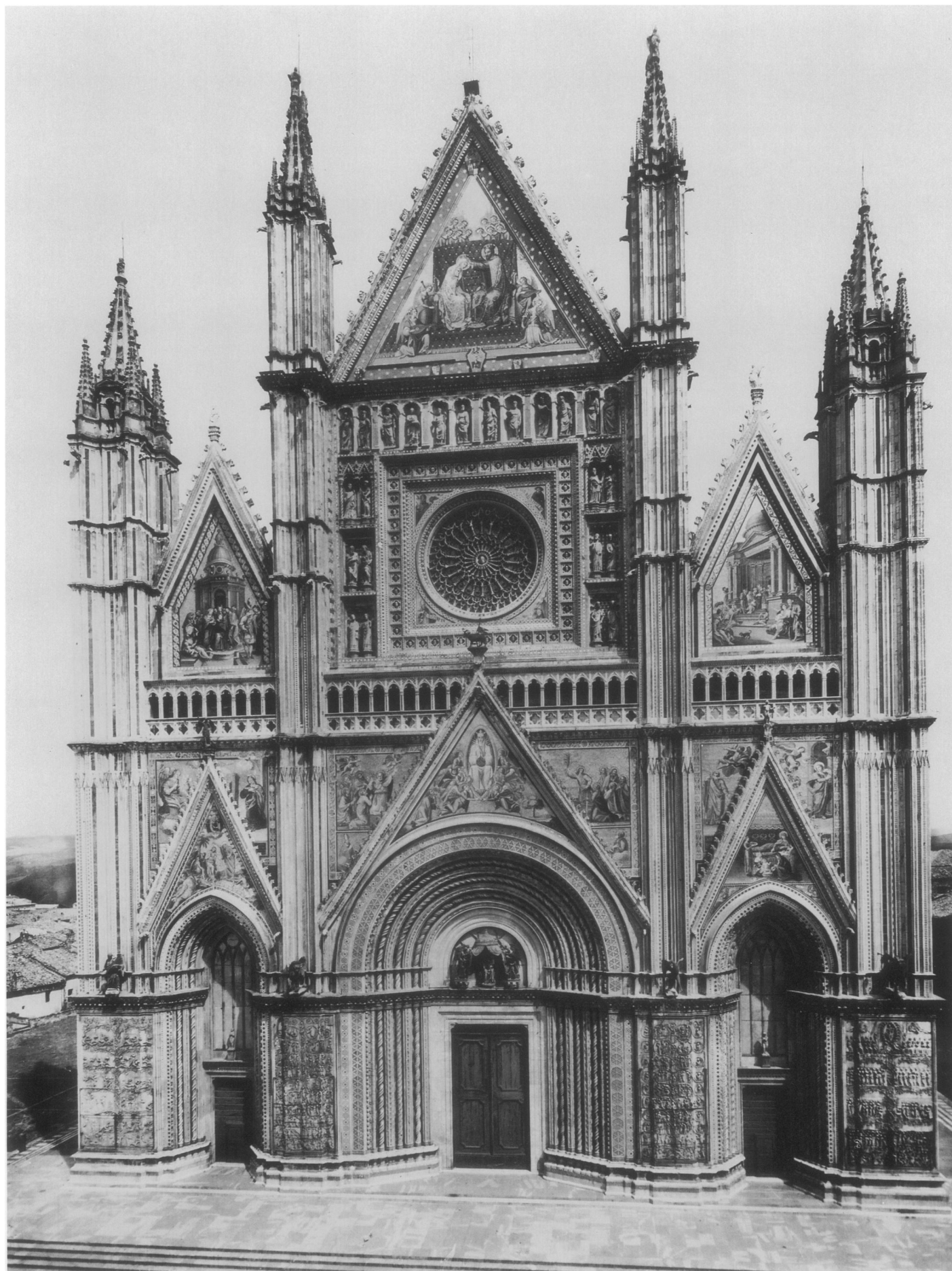
<sup>88</sup> Kitzinger, “Mosaic,” 353.

<sup>89</sup> Idem, *Monreale*, 64–68.

<sup>90</sup> S. Lauffer, *Diokletians Preisedikt*, Texte und Kommentar (Berlin, 1971), 118–19, 234–45, and F. W. Deichmann, *Ravenna, Hauptstadt des spätantiken Abendlandes*, II, 1 (Wiesbaden, 1974), 189.

<sup>91</sup> For the Leiden text, see J. Gage, “Colour in History: Relative and Absolute,” *Art History* 1 (1978), 128 note 76.



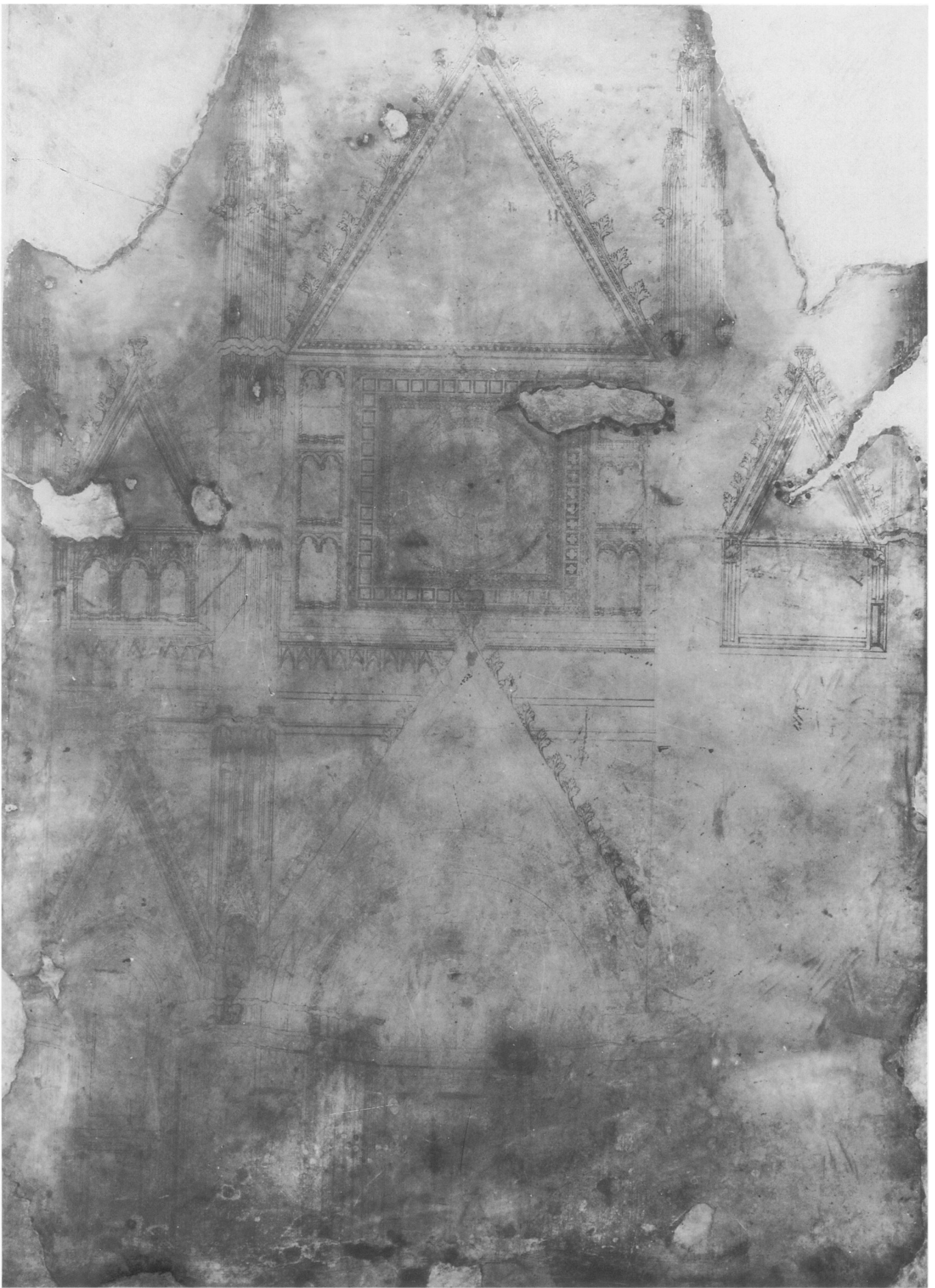


1 Orvieto cathedral, general view of facade (photo: Moretti)



2 Monocular drawing for the facade of Orvieto cathedral (photo: Archivio dell'Opera del Duomo di Orvieto)

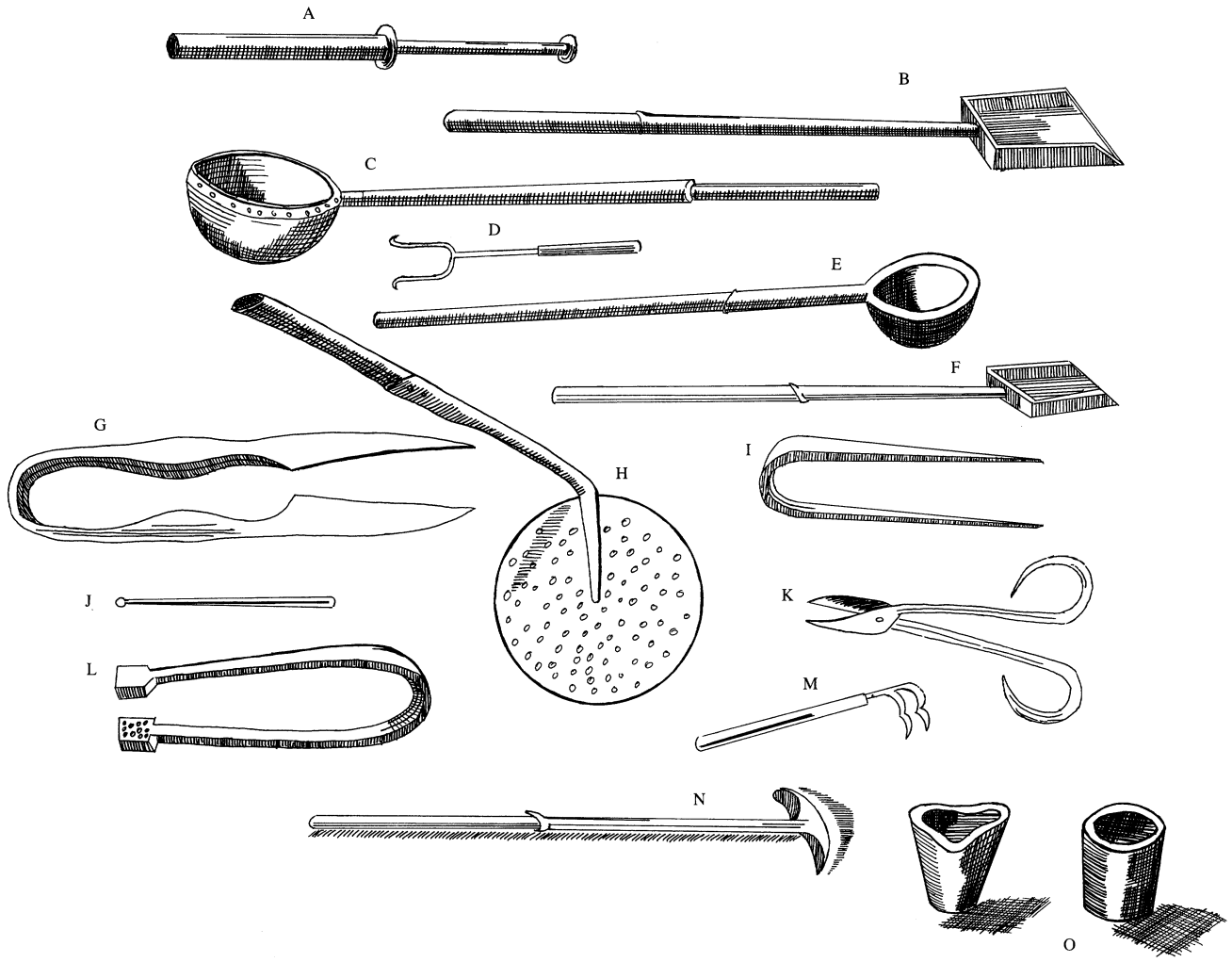




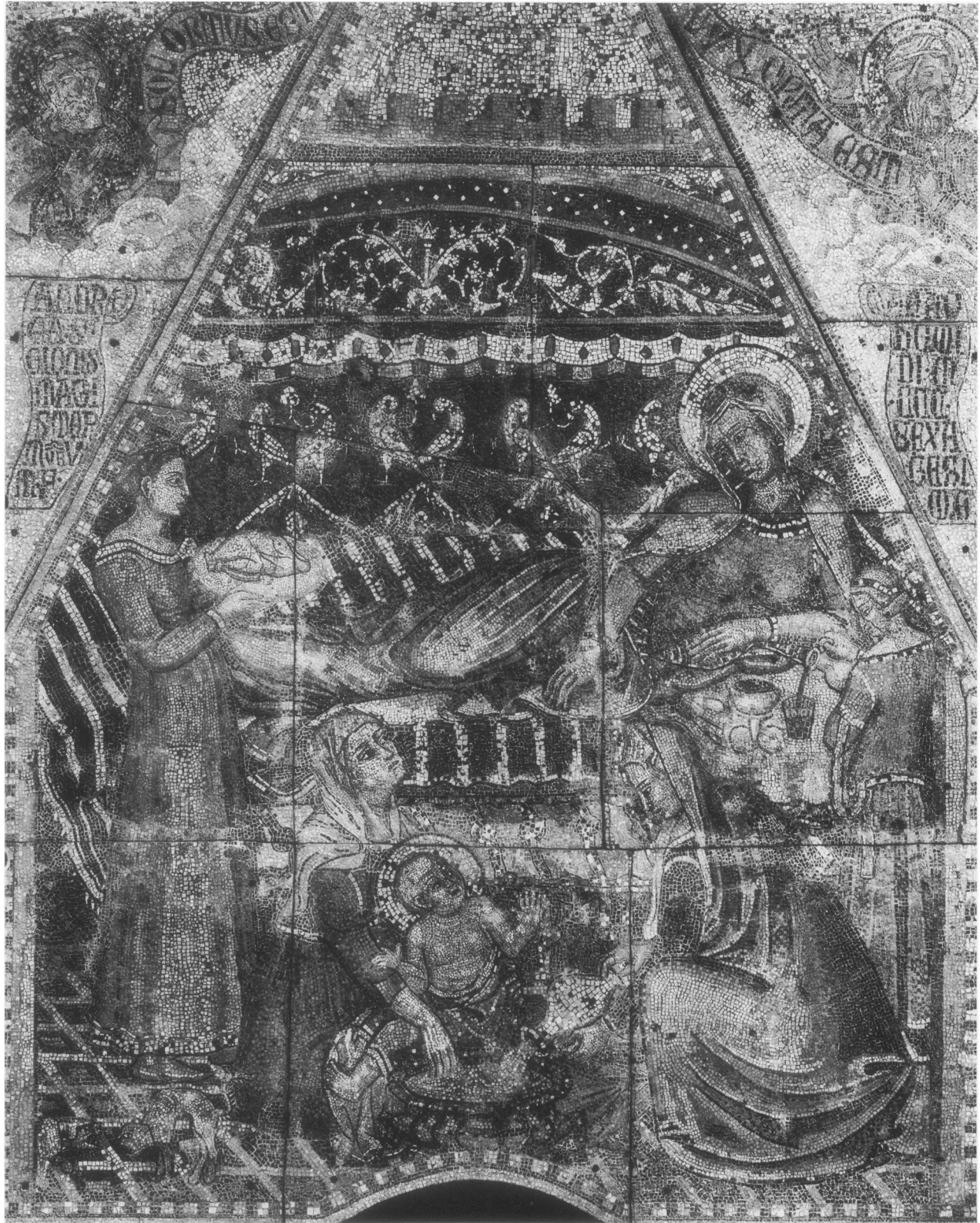
3 Tricuspidal drawing for the facade of Orvieto cathedral (photo: Archivio dell'Opera del Duomo di Orvieto)



4 A medieval glasshouse, from Sir John Mandeville's *Travels*, London, British Library, B.M. Add. Ms. 24188, fol. 16 (photo: Trustees of the British Library)



5 Glassmaking tools, based on J. Haudicoeur de Blancourt, *The Art of Making Glass*, London, 1699: (A) blowpipe, (B,F) shovels for lifting vessels, (C,E,H) ladles, (D) fork, (G,I,L) pliers, (J) pontil, (K) shears, (M) hooked fork, (N) rake for stirring glass and for moving frit, (O) vessels for molten glass (after Haudicoeur de Blancourt)

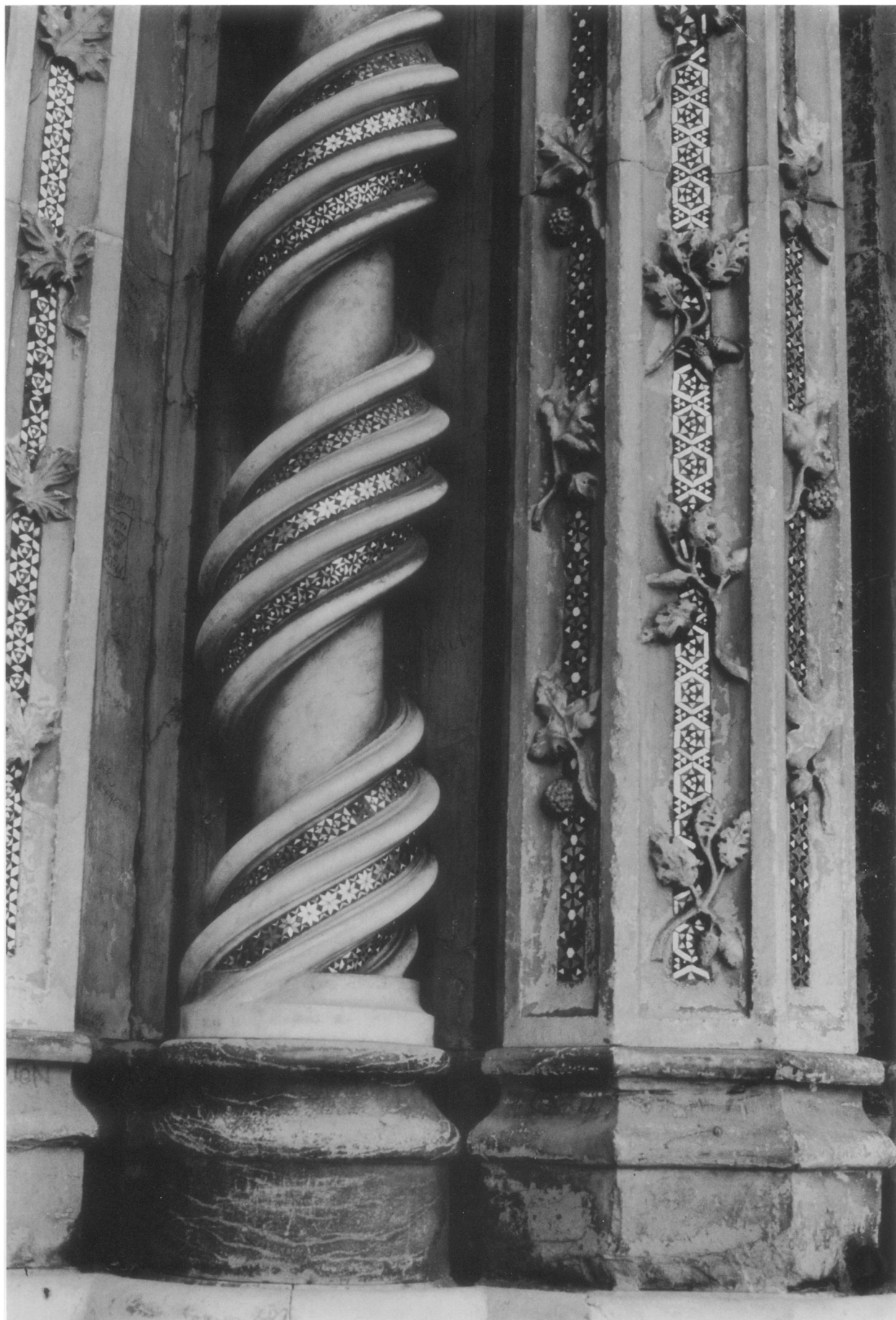


6 Fra Giovanni Leonardelli and Ugolino di Prete Ilario, mosaic of the Nativity of the Virgin from Orvieto cathedral in London, Victoria and Albert Museum  
(photo: Victoria and Albert Museum/Paul Williamson)



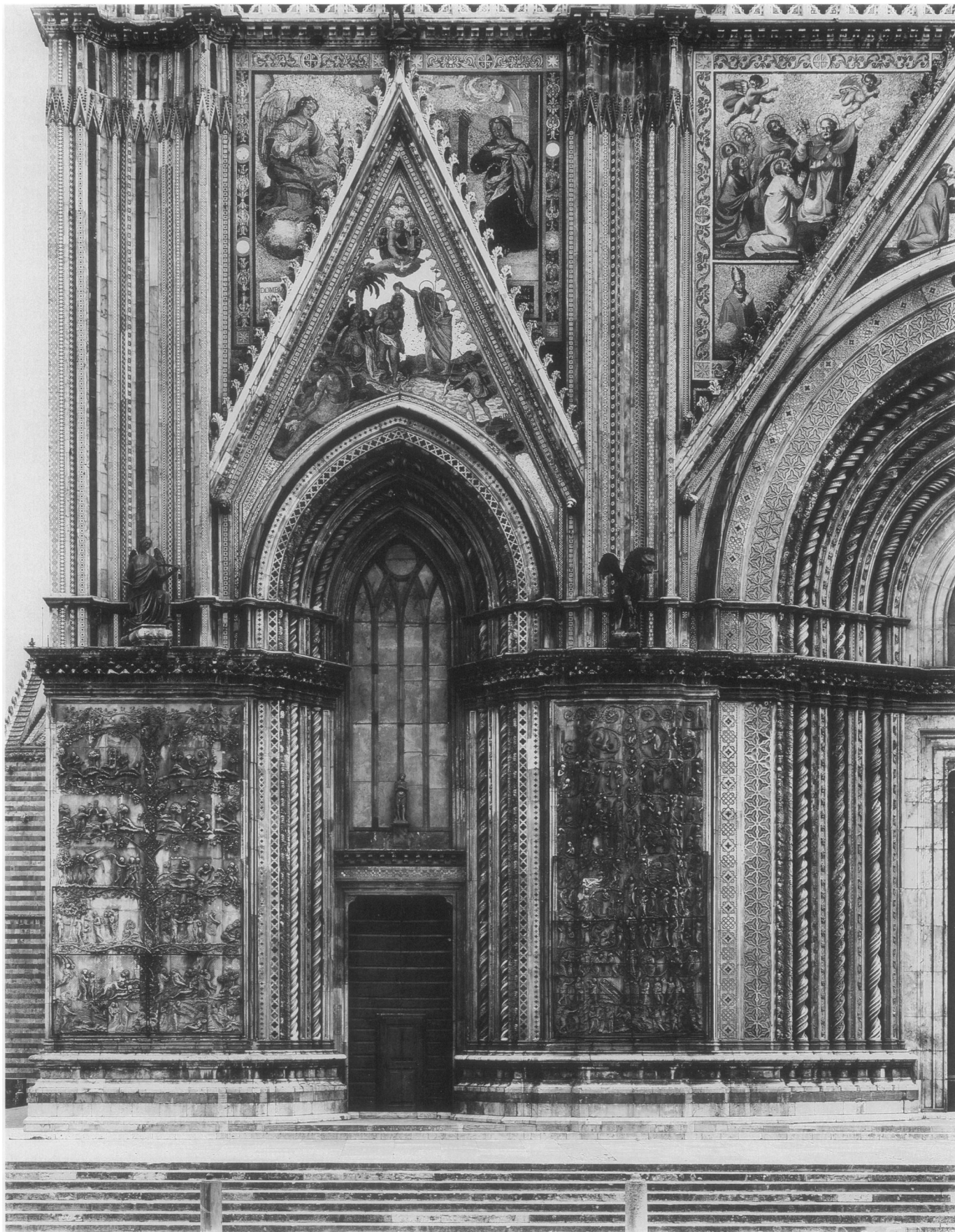


7 Detail of Christ from the mosaic of the Nativity, London, Victoria and Albert Museum

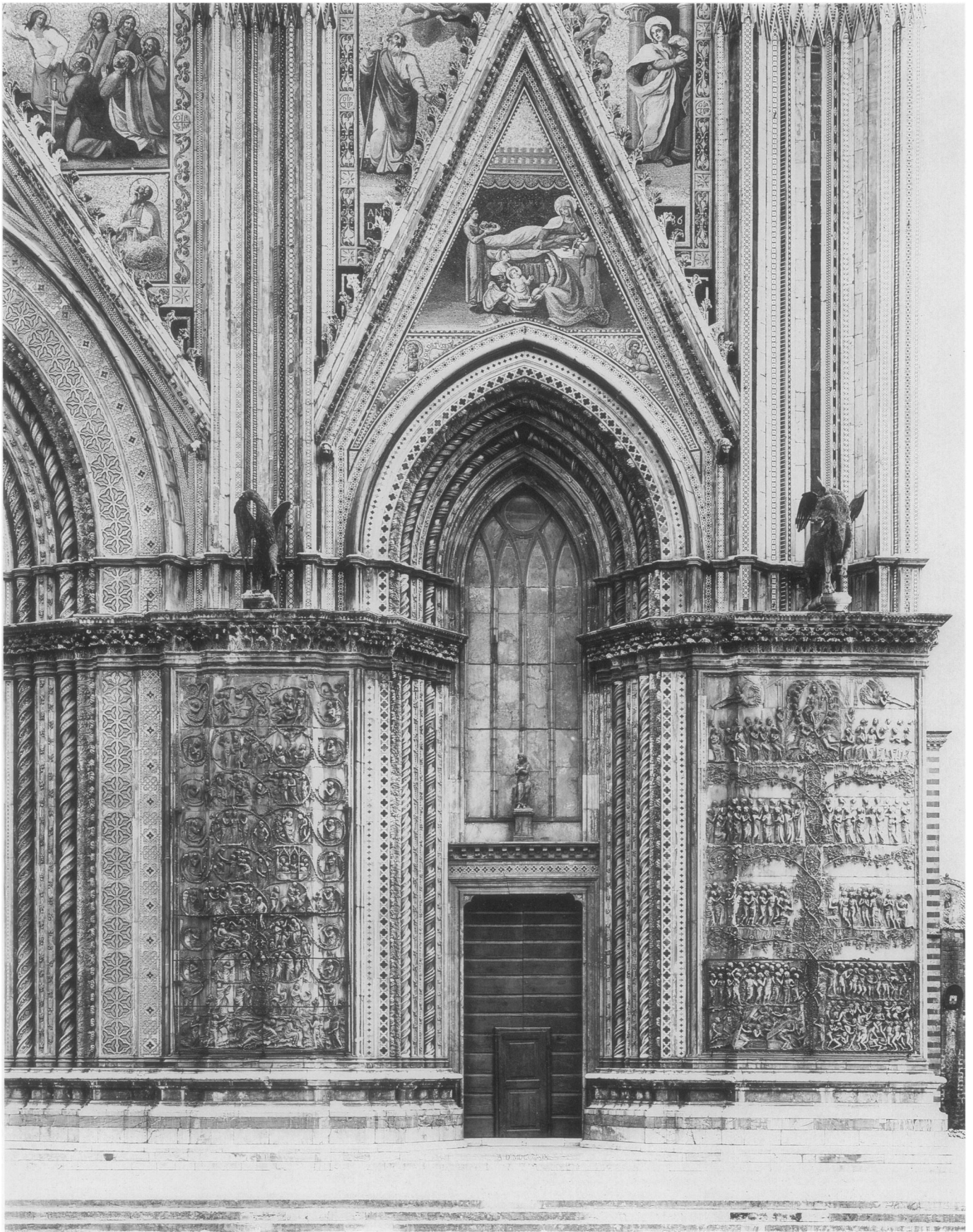


8 Detail of the architectural mosaics on the facade of Orvieto cathedral



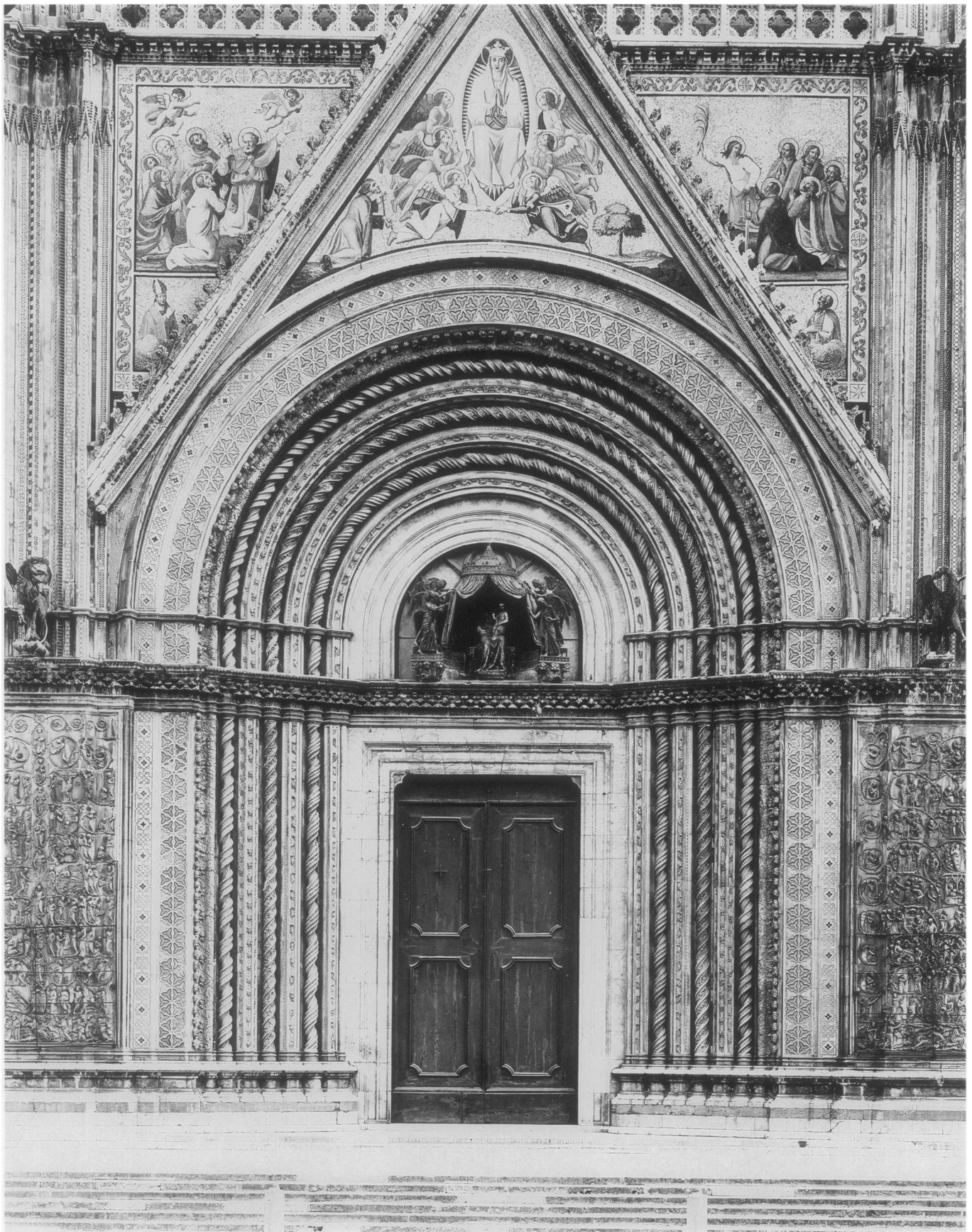


9 The mosaics of the Baptism of Christ and Annunciation to the Virgin, Orvieto cathedral  
(photo: Istituto Centrale per il Catalogo e la Documentazione, Rome)

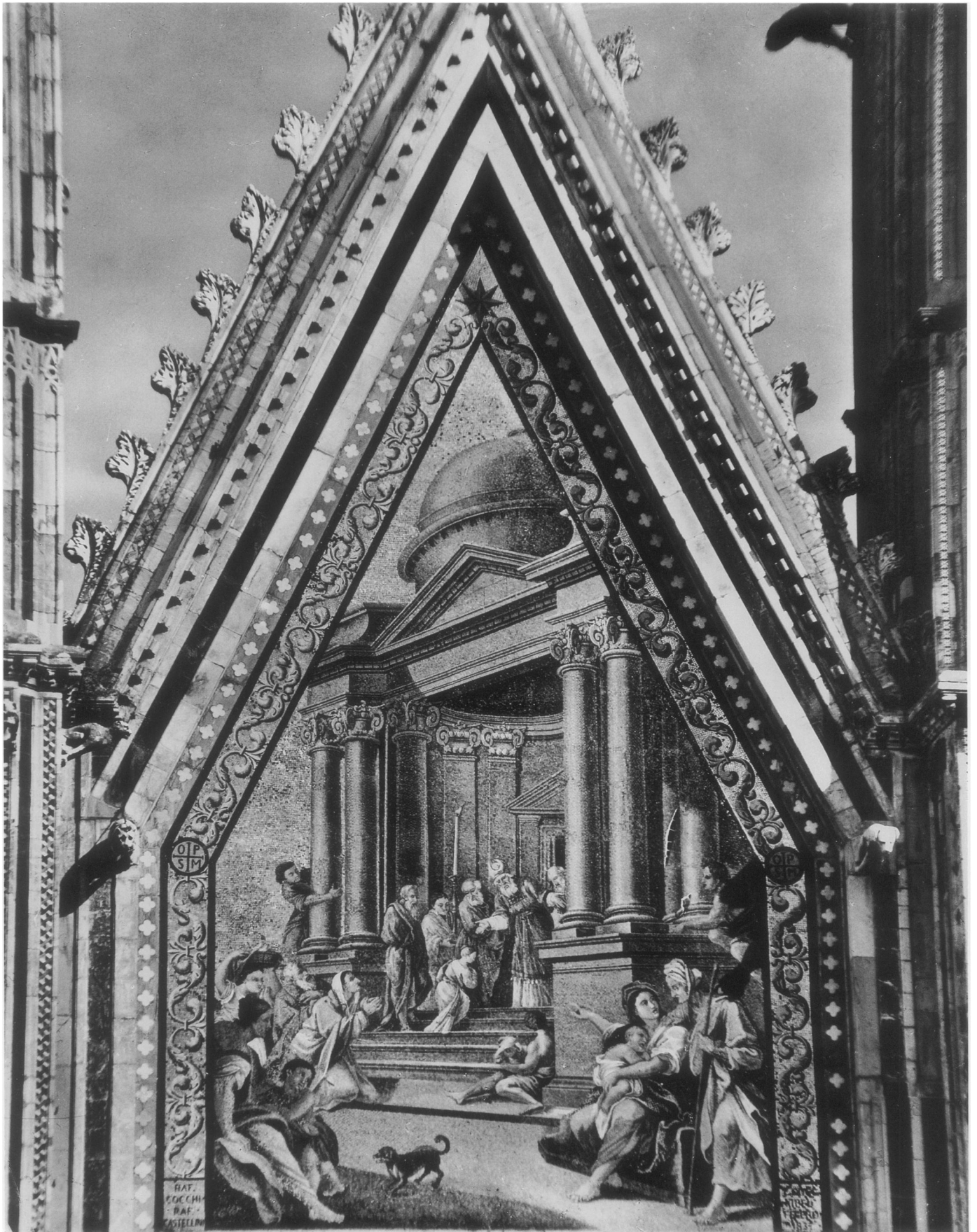


10 The mosaics of the Nativity of the Virgin and Annunciation to Anne, Orvieto cathedral (photo: ICCD)



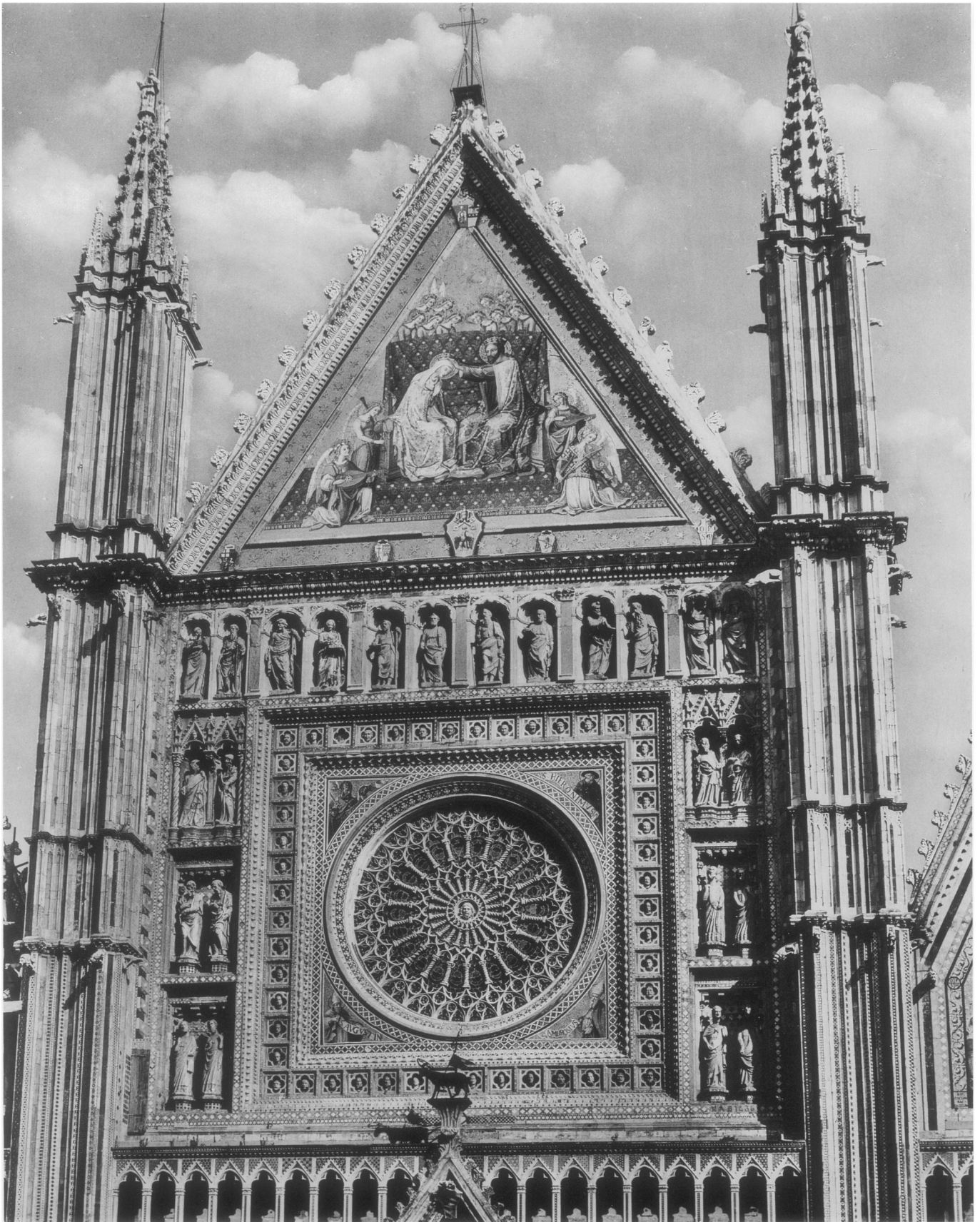


11 The mosaic of the Assumption of the Virgin, Orvieto cathedral (photo: ICCD)



12 The mosaic of the Presentation of the Virgin, Orvieto cathedral (photo: Moretti)





13 The rose window and mosaic of the Coronation of the Virgin, Orvieto cathedral (photo: Moretti)

ings as well as setting the tesserae of the mosaics on the surface of the wall.

The men who cut up the tesserae, the *incisores vitri*, are discussed here first, rather than the master mosaicists or glassmakers. This is justified not only on chronological grounds but, perhaps more important, because the documents illustrate a pattern of workshop training that is echoed in the arts elsewhere in Italy.<sup>92</sup> Most of the mosaicists at Orvieto began their careers as humble *pueri*, gradually learning every aspect of the related arts of painting, mosaic work, and glassmaking, in the transformation to master craftsmen. Perhaps the best example of the typical career of a mosaicist at Orvieto is demonstrated by Pietro Pucci, who was first taken on as an assistant to the painter Ugolino di Prete Ilario.<sup>93</sup> Several years later, he became an *incisor vitri*.<sup>94</sup> He painted a series of figures at the level of the gallery on the facade during the late 1360s and, during the next two decades, also worked as a mosaicist.<sup>95</sup> Giovanni di Bonino and Fra Giovanni Leonardelli began their careers at Orvieto as glassmakers, and they later worked in mosaic.<sup>96</sup> Orcagna was expert in both sculpture and painting, and the Orvietan authorities clearly considered him competent to work in mosaic, although they may have regretted their decision when his work began to deteriorate soon after completion. Elsewhere in Italy during the Trecento, painters such as Cimabue or Giotto also carried out work in mosaic.<sup>97</sup> The evidence from Byzantium also indicates that Byzantine craftsmen were trained in both media, as in the twelfth-century inscription from the Church of the Nativity in Bethlehem naming one Ephraim as both a painter and mosaicist.<sup>98</sup> Thus the multifaceted ex-

pertise of many of the mosaicists at Orvieto, gained during the course of their careers with the Opera del Duomo, was not unusual for the period.

### *The Incisores Vitri*

Only a small number of people were required as *incisores vitri* in the three or four decades it took to complete the inlaid architectural decoration of the facade. Their duties were quite specific—they were at first paid for “cutting and setting” the tesserae in the architectural moldings (Documents 4, 5). The complexity of their work is illustrated in Figures 8–11. A document of 21 June 1321 mentions that an *incisor vitri* was “sorting” tesserae for the mosaics, but the remaining documentation makes no further mention of this occupation, and we cannot be certain that these men were normally responsible for this aspect of the work (Document 1).

Later, when work began in earnest on the narrative mosaics in the third quarter of the century, the team included anywhere from three to six workers at a time (Documents 13, 24, 26, 58, 63, 73, 83, 85, 94). By the 1360s, they were apparently asked to make precut tesserae for the narrative mosaics, and they also assisted with the preparatory stages of mosaic work, such as carving out areas for the inset tesserae of the architectural members, and laying the mortar of the setting bed (Documents 68, 69).<sup>99</sup> In addition, various members of this workshop at times traveled to Monteleone to assist the master glassmaker with the preparation of gold tesserae (Documents 57, 76).

The first group of men working on the architectural moldings were paid either *a cottimo*, on a piece-work basis, or by the day.<sup>100</sup> In contrast, the team who later cut the tesserae for the narrative mosaics were paid a daily wage (cf. documents 4, 5, 73). However, neither method of payment in-

<sup>92</sup> Cf. the parallel with practices in Florence outlined by Wackernagel, *Renaissance Artist*, 305–6. The connection between goldsmiths’ work and sculpture is discussed by R. Krautheimer, *Lorenzo Ghiberti* (Princeton, 1970), 50–67.

<sup>93</sup> He began work on 8 January 1362, as indicated in Orvieto, Opera Archive, *Camerarius VI*, fol. 420v.

<sup>94</sup> Fumi, *Duomo*, 133, Document c.

<sup>95</sup> *Ibid.*, 135–39.

<sup>96</sup> The connection between glassmaking and mosaic was observed by A. Diem, “Techniken des Mittelalters zur Herstellung von Glas und Mosaik,” *Artigianato e tecnica nella società dell’Alto Medioevo Occidentale. Settimane di Studio del Centro Italiano di Studi sull’Alto Medioevo*, II (Spoleto, 1970), 609–32.

<sup>97</sup> For Cimabue’s mosaic at Pisa, see Trenta, *Musaici*, and Harding, *Facade Mosaics*, 216–20. Giotto’s mosaic of the Navicella is discussed by J. Gardner, *The Influence of Popes’ and Cardinals’ Patronage on the Introduction of the Gothic Style into Rome and the Surrounding Area 1254–1305*, diss. (Courtauld Institute of Art, 1969), 275–81.

<sup>98</sup> H. Vincent and F. M. Abel, *Jérusalem: Recherches de topographie, d’archéologie et d’histoire*, II, *Jérusalem nouvelle* (Paris, 1914),

158–59. Cf. Underwood, *Kariye Djami*, I, 172, who states that the artisans who produced the mosaics in this location were also responsible for the frescoes. Robin Cormack kindly drew my attention to the evidence for the manufacture of stained glass in Constantinople at a time when mosaics were also produced: M. Vickers, “A Painted Window in Saint Sophia in Istanbul,” *DOP* 37 (1983), 165.

<sup>99</sup> For a contract indicating that the mosaicists were provided with precut tesserae, see Fumi, *Duomo*, 129, Document LXXXVI.

<sup>100</sup> Riccetti, *Fabbrica del Duomo*, 158–77, discusses the various types of payment, although he concludes that further work needs to be undertaken on this problem. See also the work by H. Glasser, *Artists’ Contracts of the Early Renaissance* (New York, 1977) and Goldthwaite, *Renaissance Florence*, 321–24.

cluded any fringe benefits for these workers, and presumably they could be laid off whenever building funds dwindled.<sup>101</sup> The Opera could also shift its terms of payment on occasion, depending on the nature of the task, as in the case of Andrea Nuti, who in 1368 was first paid on a daily basis to lay the mortar for the mosaics, and some three weeks later was given a piece-work rate for the same task (Documents 68, 69).

The typical wages of a group of glass cutters are illustrated in a document of 20 June 1360. During this week, Giovanni Noritudinelli and Giovanni Petrucciolo were each paid a daily rate of six soldi, and Bartolomeo ser Dominici, two soldi six denarii a day (Document 24). To my knowledge, only one contract with a glass cutter has been preserved in the registers of the Opera Archive. This agreement, drawn up on 23 May 1369 with the glass cutter Andrea Nuti, is probably representative of contractual agreements for this type of work: he was taken on for a period of two years and promised a daily wage of nine soldi a day for "cutting and working glass for the mosaics" (Document 70). He was also required to dress stone for the cathedral, if the authorities so desired. The existence of the *incisores vitri* at Orvieto cathedral, who were responsible for cutting and setting the tesserae and providing assistance in the preparatory stages of the work, therefore confirms Kitzinger's hypothesis about a well-organized workshop of mosaic workers, some of whom were responsible for the more mundane aspects of mosaic production.<sup>102</sup> Although they might have been regarded as the "lesser" members of the team, we are nevertheless reminded of their very necessary contribution to the process of creating a mosaic.

### *The Magistri Vitri*

Although relatively little is known about the glassmaking industry in Umbria during this period, the Orvieto documents reveal that knowledge of the craft was passed on from one member of a family to another. Consilio of Monteleone, employed by the Opera del Duomo for over forty years, ran a family business, and evidently trained his nephew Nucciarello to take over the workshop during the 1360s (Document 42). In fact, both for-

est and town glasshouses were traditionally organized along these lines elsewhere in medieval Europe.<sup>103</sup>

The glassmakers do not appear in the Orvietan list of guilds and corporations datable to 1350, but even in a city as large as Florence, early fourteenth-century glaziers had to join a larger guild, the *Arte dei Medici e Speciali*, which also included the town's artists and artisans, because of insufficient numbers.<sup>104</sup> The apparent absence of any detailed documentary evidence on artists' guilds at Orvieto does not permit us to ascertain whether a similar arrangement was followed at Orvieto.

Consilio, referred to as *stopparius* in the early documentation, began to manufacture gold and colored glass in 1321 (Documents 1, 2).<sup>105</sup> This term was eventually dropped, and he became known instead as *magister vitri*.<sup>106</sup> During his career with the Opera, he produced the window glass, tesserae to be used both in the figural mosaics and architectural elements of the facade, as well as lamps and other glass vessels.<sup>107</sup>

In the first registers dating to the 1320s we learn that Consilio worked with at least one other *stopparius*, Ghino Petri, and several assistants (Documents 1, 2). A number of other individuals are mentioned as "serving" at the glass furnace, which may mean that they were responsible for maintaining a fire in the furnace (Document 1). The same entry also reveals that the Opera sometimes paid for a supply of wine for Consilio and his fellow workers; the officials had apparently agreed to give the *magistri vitri* a barrel of wine when they worked at the glass furnace. There is, however, nothing unusual about this practice in medieval

<sup>103</sup> See Polak, *Glass*, 23 ff. Kenyon, *Glass Industry*, 115–45, gives detailed information on glassmaking families in England.

<sup>104</sup> The Orvietan list is discussed in G. Pardi, *Comune e Signoria a Orvieto* (repr. Rome, 1974), 5–9. For the Florentine guilds, see A. Doren, *Entwicklung und Organisation der Florentiner Zünfte im 13. und 14. Jahrhundert* (Leipzig, 1897), 106, and E. Staley, *The Guilds of Florence* (London, 1906), 262 ff, for a brief history of the glass industry in Florence during the Trecento.

<sup>105</sup> The *Dizionario Etimologico Italiano*, ed. C. Battisti and G. Alessio, V (Florence, 1950–57), 3642, suggests that the verb *stoppare* means to seal or stop up, or to caulk. During the 15th century in Genoa, the term *stuparius* was reserved for workers who sealed the hull of ships.

<sup>106</sup> Cf. Fumi, *Duomo*, 119, Document xxiv. Consilio was banished from Orvieto at one stage, after he and others went on the rampage in the district of San Casciano. However, on 12 February 1328, the Opera officials decided that he must return to work to make gold and silver glass for the mosaics. He was ordered to take a considerable reduction in salary.

<sup>107</sup> For Consilio's production of lamps see *ibid.*, 120, Document xxxii.

<sup>101</sup> *Ibid.*, 325, for similar working conditions in Florence. Artisans' wages in Florence during the Trecento are examined by C. M. de la Roncière, *Prix et salaires à Florence au XIVe siècle (1280–1380)* (Rome, 1982).

<sup>102</sup> Kitzinger, *Monreale*, 20 ff, 67.

Italy, and it may have been a payment in lieu of cash, as occurred at other construction projects.<sup>108</sup>

In a contract drawn up with Opera officials during 1362, Consilio was instructed to manufacture the glass tesserae at his own expense, together with the window glass for the chapel of the Holy Corporal (Document 42). This glass was then bought from him at a rate of four soldi a pound. He was paid a different rate for each piece of gold glass, and we may assume that a piece of this glass at two soldi six denarii was more expensive to produce than colored glass, as a result of the additional time required to place the metal foil between two layers of glass.<sup>109</sup> Transportation costs to and from the glasshouse at Monteleone were paid for by the Opera.

Earlier, in 1347, Consilio was paid two soldi for each piece of gold glass, four soldi for each pound of colored glass, and two soldi six denarii for each pound of recut glass, revealing that the glassmakers could also include materials from their existing stores (Document 7). This is confirmed in a contract of 1362 with another glassmaker, Andrea Nelli Zampino, who was paid only one and a half florins per hundredweight of "old glass."<sup>110</sup>

One interesting detail of Consilio's contract of 1362 is the stipulation that the glass must be "new and clean" (cf. Documents 3, 42). This was presumably for the Opera's protection, in the event that Consilio, or any other glassmaker, tried to pass off their product wrongly as being made from principally new material. The extensive use of cullet, or waste glass which had been melted down for reuse, would have lessened the total production costs for Consilio.<sup>111</sup> If any of the glassmakers used a large amount of cullet in their products, the Opera could risk overpaying them, and the officials apparently tried to control this situation. Indeed the detailed nature of Consilio's contract illustrates how the Opera sought to protect its interests.<sup>112</sup>

From 1362 to 1364 both Consilio and Andrea

Nelli Zampino were involved in the production of glass tesserae. The only surviving contract with Zampino dates to 1362, although his presence at Orvieto is first recorded in 1360, when he was paid for some glass and rebuilding the glass furnace near the cathedral site (see also Document 34).<sup>113</sup> His place of origin is given as San Miniato al Tedesco near Florence, confirming that the glass-working industry documented there around 1321 was still producing qualified craftsmen over four decades later.<sup>114</sup> The contract stipulates that he was to produce glass tesserae at his own expense "in all and each single color with its various shades, except the color blue, for the aforesaid mosaics."<sup>115</sup> He was required to make a separate accounting for the color blue; the Opera did, however, supply him with gold leaf.

Again, the different types of tesserae were assessed according to their relative value: if made from new glass, Zampino was paid the highest price; if composed of a mixture of old glass and pieces of preexisting mosaic from the Opera stores, he was paid only a quarter of the price. In turn, the *camerarius* would purchase the tesserae from him every Saturday. At the same time, he was granted the additional privilege of the use of a furnace, a house, and some bedding, no doubt because he was working in Orvieto itself, and not at the *contado* glassworks. Finally, he was commanded to purchase the necessary equipment for glass-working, and to add this expense to the total price of the glass. In comparison with the working conditions of the glass cutters outlined above, it is clear that both Zampino and Consilio enjoyed positions of some importance in the Opera project, perhaps because of the need to ensure the presence of qualified glassworkers for the mosaics and window glass.

These two men had disappeared from the records by 1364. A new glassmaker, Consilio's nephew Nucciarello, was taken on by the Opera, and he was still actively producing glass and mosaic tesserae at Monteleone into the late 1380s (Documents 43, 57, 74, 76, 91). Nothing is mentioned in his contract of 1364 about lodgings, nor was he given the same detailed instructions about

<sup>108</sup> As discussed by Wackernagel, *Renaissance Artist*, 344, and Goldthwaite, *Renaissance Florence*, 291–92.

<sup>109</sup> A similar arrangement was followed at Pisa during 1302, when pieces of gold glass cost twelve denarii each, as compared with a price of two soldi per pound of colored glass; the documentary evidence is found in Trenta, *Mosaici*, 77.

<sup>110</sup> As in note 38 above.

<sup>111</sup> Cullet, or pieces of broken glass, was added to the mixture to assist the fusing of the different elements, as well as being more economical. This explains why so little material remains when glassworks are excavated because, unlike pottery, waste glass may be reused.

<sup>112</sup> Riccetti, *Fabbrica del Duomo*, 178–91. For a general discussion of this problem, see Glasser, *Artists' Contracts*.

<sup>113</sup> Fumi, *Duomo*, 126, Document LXXVI.

<sup>114</sup> The documentary and archaeological evidence for Italian glassmaking sites is summarized by D. Whitehouse, "Notes on Late Medieval Glass in Italy," in *Annales du 8e Congrès de l'Association Internationale pour l'Histoire du Verre* (Liège, 1981), 165–77.

<sup>115</sup> As in note 38 above.

the production and purchase of tesserae. He was taken on for a trial period of thirty-five days, and required to produce tesserae in all quantities and colors, and to "make and place gold leaf in two layers of glass."<sup>116</sup> In return, he was promised four soldi per pound of colored glass tesserae, and almost as much again for each piece of gold glass. He was also granted the services of one assistant when he made gold glass and put the glass in the furnace, and several payments were made for the services of the *incisores vitri* in this role (Documents 76, 91). Transportation of the glass from his furnace at Monteleone to Orvieto was to be paid for by the Opera, reminding us that the furnaces were located close to the forests with their abundant supplies of raw material and fuel.

Nucciarello is mentioned on occasion in the late 1380s, but little else of significance may be learned from this point onward about the production of glass tesserae in the Trecento. By the next century, some of the tesserae were furnished by glassmakers in Piegario, and the Opera also purchased their supplies in Siena, Perugia, and Venice.<sup>117</sup> The documents therefore provide a rare insight into the technical and workshop procedures followed by another group of workers on the mosaics, the *magistri vitri*.

### *The Magistri Mosaici*

The Orvietani's decision to decorate the cathedral facade with mosaic evidently necessitated a search for qualified craftsmen, at least at the outset of the project; such a measure was quite common during this period. Even in a center like Rome, which had a relatively well-established tradition of work in mosaic, it was necessary to turn elsewhere for skilled workers, as suggested by Pope Honorius III's letter to the Doge of Venice requesting the services of several mosaicists.<sup>118</sup> In 1345 Opera officials sent to Perugia to obtain the services of the glassmaker Giovanni di Bonino for the mosaics.<sup>119</sup> The documents also demonstrate that mosaicists had to be prepared to travel in pursuit of work: the glassmaker and mosaicist Nello Giacomini came

from Rome, and Orcagna was normally resident in Florence.<sup>120</sup> As a result of their presence here, a local workshop of mosaicists was gradually established, which included Fra Giovanni Leonardelli, Ugolino di Prete Ilario, and Pietro Pucci. An official statement to a similar end was issued in Venice during 1258, when the Procuratoria of San Marco declared that each mosaicist must train two assistants to ensure the continuity of work.<sup>121</sup>

Nothing has survived of Giovanni di Bonino's efforts as a mosaicist between 1345 and 1347, but the documents do suggest that he worked in "setting" the mosaics (Document 9). Another document of 1347 records a payment for his lodgings, yet a further indication of the privileged status of master craftsmen such as the glassmakers and mosaicists (Document 10).

Orcagna's contract drawn up on 14 June 1358 stipulates that, apart from his duties as *capomaestro*, he was to sculpt, paint, polish figures of marble, as well as work on the mosaics, and he was permitted fourteen months' grace from his contractual obligation to complete his work on the Or San Michele tabernacle in Florence.<sup>122</sup> A document of 16 June 1358 indicates that he spent eight days at the Franciscan hospice in Orvieto during the negotiations (Document 16). Perhaps in anticipation of his role as *capomaestro*, he came to Orvieto for a brief period in February 1359, to examine the Opera's supplies; he later sent them a quantity of blue through his intermediary, Donnino of Florence.<sup>123</sup> A similar concern with materials is demonstrated in the document of 21 June 1321, when Lorenzo Maitani, then *capomaestro* at Orvieto cathedral, Consilio, and another colleague apparently busied themselves with the production of gold tesserae in the glasshouse (Document 2). The intricacies of producing these tesserae evidently gave rise to a consultative session in the glasshouse, and the records reveal that it had to be demonstrated again on two other occasions (cf. Documents 35, 43). Although these episodes might at first seem unusually mundane tasks for a *capomaestro* or master mosaicist, these individuals were clearly responsible for a strict control over materials used in the cathedral

<sup>116</sup> Fumi, *Duomo*, 133, Document CIII.

<sup>117</sup> *Ibid.*, 140–64.

<sup>118</sup> As published by P. Pressutti, *Regesta Honorii Papae III*, I (Rome, 1888), 173. Similarly, the Florentines had at times to "import" their mosaicists to work in the Baptistery from centers such as Venice; see F. Filippi, *L'arte dei mercanti di Calimali in Firenze* (Turin, 1889), 78–79. The tradition of mosaic in Rome during the 13th and 14th centuries is discussed by Harding, *Facade Mosaics*, 107 ff.

<sup>119</sup> Fumi, *Duomo*, 121, Document xxxviii.

<sup>120</sup> The dissemination of mosaicists following the closure of the projects in Sicily is discussed by Demus, *Norman Sicily*, 453–57; for the Venetian evidence, see *idem*, *San Marco*, II, 223–28.

<sup>121</sup> *Ibid.*, II, 291. Cf. the situation at Monte Cassino noted by H. Bloch, *Monte Cassino in the Middle Ages* (Rome, 1986), 91–92, who states that Desiderius wanted above all else to obtain the Greeks' technical expertise in this medium.

<sup>122</sup> Fumi, *Duomo*, 477.

<sup>123</sup> Offner, *Corpus*, 14.

project. Further proof of this is demonstrated by the detailed set of instructions drawn up by Orcagna regarding Donnino's purchase of glass in Venice (Document 17).

The records for 1359–60 and 1361 indicate that Orcagna and his assistants were at work on one of the facade mosaics, which may be identified as the Baptism of Christ (Fig. 9).<sup>124</sup> He was absent from Orvieto from February or early March until September 1360, when he returned to Florence, and this prompted the Orvietan officials to renegotiate his contract and oblige him to finish his work on the mosaic within three months.<sup>125</sup> The document of 16 September 1360 indicates that the final price for Orcagna's mosaic was to be decided by four arbitrators of Orvieto.<sup>126</sup> By the end of the fourteenth century, the *lodo* was a common method of payment for Italian works of art, and it became standard practice at Orvieto to have the master mosaicists' work assessed by this method. As the documents demonstrate, an estimate of the final price to be paid for the mosaic was calculated by an independent committee composed of two individuals representing the interests of the contracting party, in this case, the Opera del Duomo, while several others represented the artist's interests.<sup>127</sup>

The mosaic was apparently finished within the agreed term, because in February 1361 the authorities called on Nello Giacomini from Rome to approve Orcagna's mosaic. We are not told what Nello thought of the work, although on 22 March 1361, tesserae extracted from the mosaic had to be reset by one of the *incisores vitri*.<sup>128</sup> The mosaic was also measured at this time.<sup>129</sup> The officials apparently decided to leave Orcagna's mosaic for at least a year before awarding him a final price, and they must have asked Nello to stay on in Orvieto, to work as a *magister mosaici*.

The report drawn up by the assessors of Orcagna's mosaic in 1362 emphasizes three main points of criticism: it begins with the observation that the mosaic did not seem to have altered from the time

of its completion, except that (and this must have caused Opera officials some concern) a large part "both of the colors placed on the glass and the mortar were missing."<sup>130</sup> Next, it was noted that the mosaic did not seem secure because of the improper setting of the tesserae, and the fact that the mosaic background and its figures were not flat. Finally, the mortar was not lying to the very top of the tesserae. Despite this somewhat negative verdict, Orcagna was awarded sixty florins for his efforts, and he returned to work in Florence.<sup>131</sup>

Nello Giacomini's contract of 16 May 1361 specifies that he was to be given a house at the Opera's expense; only a few days earlier he had been provided with some bedding (Document 37). This contract covered a four-year period, although it could be dissolved after the first year of work, and he was to be paid a monthly salary of ten florins, as indicated in Document 39. No mention is made anywhere of a committee assessment to determine the final price of his work, although we may assume that he too would have been subjected to this condition. Furthermore, he was not required to work on the mosaics in December and January because of the inclement weather. During these months he was to work "in coloring and making the coloring agents for the glass to be used in the mosaics, or whatever else was required"; the agreement also states that he was an expert in "painting, and in making and coloring glass."<sup>132</sup>

Nello is recorded at work on the *incrustationes* in 1362, referring presumably to the architectural mosaics, although he worked on the narrative mosaics as well.<sup>133</sup> This is confirmed in the contract of 1362 with Fra Giovanni Leonardelli, which states that he was required "to follow and finish the work begun by Master Nello from Rome."<sup>134</sup> The area mentioned in this document is described as above the door of the facade nearest to the bishop's palace, which may mean either the mosaic of the Annunciation to Anna or the Nativity of the Virgin (Fig. 10). As in the cases of Giovanni di Bonino and Orcagna, Nello was responsible for a wide range of tasks relating to the mosaics, including their design, the manufacture of tesserae, and the setting of the mosaics on the wall. He left the service of the Opera del Duomo on 10 June 1362,

<sup>124</sup> Ibid., 13–19. Although Orcagna's contract does not mention this detail, the documents indicate that he was given the services of at least one assistant.

<sup>125</sup> Ibid., 17.

<sup>126</sup> Ibid. The following discuss the *lodo*: H. Lerner-Lehmkuhl, *Zur Struktur und Geschichte des florentinischen Kunstmarktes im 15. Jahrhundert* (Wattenscheid, 1936), esp. 18; Wackernagel, *Renaissance Artist*, 344; Glasser, *Artists' Contracts*; and White, *Duccio*, 179 note 4.

<sup>127</sup> Fumi, *Duomo*, 132, Document xcvi.

<sup>128</sup> Ibid., 123–24, Documents XLVIII and LVI. These records date to 1361, not 1360 as he states.

<sup>129</sup> Ibid., 128, Document LXXX.

<sup>130</sup> Ibid., 130, Document LXXXVIII.

<sup>131</sup> Ibid., 130, 131, Documents LXXXIX, xc, xci.

<sup>132</sup> Ibid., 127, Document LXXVII.

<sup>133</sup> Ibid., 125, Document LXIV, which dates to 1361, not 1360 as cited by Fumi.

<sup>134</sup> Ibid., 129, Document LXXXVI.



after working on the mosaics at Orvieto for one year and seventeen days.<sup>135</sup>

The last three mosaicists to be considered, Fra Giovanni Leonardelli, Ugolino di Prete Ilario, and Pietro Pucci, proved to be devoted servants of the Opera del Duomo. Fra Giovanni first worked as a glassmaker at Orvieto in 1325, and during the 1350s and 60s the Opera asked him to manufacture some of the cathedral's windows as well as work in mosaic (Documents 14, 15, 46).<sup>136</sup> During the 1360s he helped to lay the setting bed for the latter, as well as cutting up glass for the tesserae (Documents 21, 23, 26, 67,). He executed preparatory or auxiliary drawings for the mosaic of the Baptism of Christ, for, as we have seen, a sheet of parchment was purchased in 1360 so that he might draw the figure of John the Baptist. He was later given sinoper, *terra verde*, and ochre "to draw," referring presumably to underpaintings for the mosaic that he and Orcagna were creating (Document 28). At the same time he traveled to Venice to purchase glass and other materials for the Opera, and he also went to Monteleone to teach Consilio's nephew how to make gold glass (Document 43).<sup>137</sup>

His contract of 26 August 1362 provides invaluable information about the agreements reached with masters who were seemingly both *pictor* and *artifex*. It stipulates that his work must be made "with good plaster and drawing and firm and sufficient measurement."<sup>138</sup> If the officials considered his work unsatisfactory, he was to remake the mosaic at his own expense. He asked for the services of two *intagliatores* when he was making the mortar and setting the mosaics on the wall. In this instance, the term *intagliator* may not mean a sculptor but an assistant who actually set the tesserae. Fra Giovanni also requested a supply of colored, precut tesserae for the mosaics, reminding us that the glass cutters mentioned so frequently in the records were responsible for this task. In addition, he offered to be paid by the month or on a daily basis; the final price for his work was to be assessed by a committee. He was paid a monthly rate of six gold florins throughout the 1360s, as, for example, in Documents 49, 51, 56, 59, 61, 66.

Fra Giovanni's contract was in fact renegotiated on a yearly basis until 1370, and the details of the agreement drawn up in 1368 and recopied in the records for the following two years are most infor-

mative: the Opera was to provide the materials for his work and he was apparently given the services of an assistant.<sup>139</sup> Again, the final price for his work was to be decided by a *lodo*.

The only surviving assessment concerning a mosaic made by him, the Annunciation to Anna, dates to 1363. The report states that his work was "flat, perfectly, beautifully and well-made," and in addition, that "the figures were beautiful and the mortar was good."<sup>140</sup> He was awarded fifty florins, ten florins less than Orcagna had been paid. The terse nature of the documents, however, does not permit any secure explanation of this difference in price, which may have been the result of a variation in their size, or the possibility that Orcagna simply commanded higher prices for his work. Fra Giovanni is not mentioned again in the records after 1370.

During the late 1360s Fra Giovanni collaborated on the mosaics with Ugolino di Prete Ilario, who also executed the frescoes of the apse and chapel of the Corporal in the cathedral.<sup>141</sup> Ugolino was asked to sit on the various committees to judge the mosaicists' work, as occurred in 1362 with his assessment of Orcagna's work. Although he worked primarily as a painter, he must surely have picked up some knowledge of this medium as a result. It has been suggested that he provided designs for the mosaics, and that Fra Giovanni was a mere craftsman responsible for the setting of the mosaic on the wall surface.<sup>142</sup> However, a brief contract with Ugolino dating to 1364 explicitly states that he was to work "in mosaic on the facade of the church of the Blessed Virgin together with Fra Giovanni Leonardelli," proof that he was also responsible for all aspects of mosaic work.<sup>143</sup>

As occurred at other medieval mosaic projects, both these men probably set the more important sections of the work, leaving the backgrounds and other less important details to their assistants.<sup>144</sup> Ugolino and Fra Giovanni worked together on the mosaic of the Annunciation to Anna as well as the Nativity of the Virgin (Fig. 10).<sup>145</sup> Ugolino contin-

<sup>135</sup> Ibid., 135, Document CXIX.

<sup>140</sup> Ibid., 132, Document xcvi.

<sup>141</sup> For Ugolino's work as a painter, see Z. A. Cox, *Ugolino di Prete Ilario, Painter and Mosaicist*, diss. (New York University, 1976), although this study does not discuss the many unpublished documents concerning this master. See my forthcoming study on the decoration of the chapel of the Corporal.

<sup>142</sup> As stated in an unpublished report at the Victoria and Albert Museum, London, n.d.

<sup>143</sup> Fumi, *Duomo*, 133, Document ci.

<sup>144</sup> Cf. the evidence cited by Mouriki, *Nea Moni*, 104.

<sup>145</sup> Fumi, *Duomo*, 132–33, 136, Documents xcvi, ci, cxx.

<sup>135</sup> Ibid., 128, Document LXXXV.

<sup>136</sup> Ibid., 135, 215, Documents CXIX, XXIII.

<sup>137</sup> Ibid., 123–24, Documents LIV, LXIII.

<sup>138</sup> Ibid., 129, Document LXXXVI.

ued to be active as a mosaicist in the late 1360s, although the records do not specify what he was working on; he was paid the same salary as Fra Giovanni (Document 61, 66). He returned to work on the mosaics in 1380 after working on the paintings in the apse, and his will was drawn up in 1384, suggesting that he died shortly thereafter (Document 81).<sup>146</sup>

A new *magister mosaici*, Pietro Pucci from Orvieto, was taken on by the Opera in 1380 (Document 80). His signature and a date of 1376 may be seen on the mosaic of the Presentation in the Temple: PETRUS PUTII DE URBEVETERI ME FECIT ANNO MCCCCLXXVI, suggesting that he had already begun work on the mosaic some years before. As noted above, Pietro first worked as Ugolino's assistant on the frescoes of the chapel of the Corporal in 1362, and as an *incisor vitri* with Fra Giovanni.<sup>147</sup>

His contract was renewed in 1381, and he was paid a monthly rate of four florins; although the agreement does not mention this detail, the final price for his work was probably determined by an independent committee, as had happened before with Orcagna and Fra Giovanni.<sup>148</sup> The contract mentions that he was to work on the mosaic in the gable above the *porta inferni*, which must refer to the mosaic of the Presentation (Fig. 12). Several months later, he requested the services of some *incisores vitri*: the supply of precut tesserae had apparently run out.<sup>149</sup> The glass cutters were taken on for a year and paid on a daily basis, as indicated in Documents 83, 86. By 1388 Pietro is recorded at work on the mosaics of the Four Church Fathers around the rose window (Fig. 13) (Documents 95, 96). Work on the mosaics was gradually discontinued during the 1390s, and the two remaining gables were not completed until much later.<sup>150</sup>

The surviving documentation concerning this artist is of some interest, for it indicates that on two separate occasions he threatened to lay down his tools and not work any further until he was given a pay raise. In the first instance (1386) he asked for six florins a month instead of four, although he was only awarded five and a half, and two years later, he again threatened to stop working unless he was given one soldo more a day (Documents 90,

92).<sup>151</sup> The negotiators only agreed to half a soldo, and they spent some time deliberating whether the increase was warranted. Although his case is not unprecedented in the history of medieval labor relations, it does suggest that artists and artisans at Orvieto could bargain about their conditions of employment during this century.<sup>152</sup> We are thus reminded that master craftsmen, such as the mosaicists and glassmakers, enjoyed the most favorable conditions of employment at Orvieto, and they evidently made the most of their elevated position within the hierarchy of workers at the cathedral. Their individual salaries varied, but they were paid substantially more than the semiskilled or unskilled workers, as, for example, when Fra Giovanni's salary of six florins (paid in 1368 and 1369) is contrasted with the daily wage of nine soldi awarded the *incisor vitri* Andrea Nuti (cf. Documents 66, 70). Again, a comparison of the daily wage of twenty-one soldi paid to Fra Giovanni in 1360 with the six soldi of the glass cutter Giovanni Noritudinelli indicates a patent difference in their economic status (Document 26).

It is not the intention of this article to suggest that Byzantine and other Western medieval mosaic projects were organized along identical lines. Nor is it to be inferred that on-site glass furnaces were the norm for other cycles. But the documentation does illustrate how tightly structured the workshop was, with the *capomaestro* and Opera officials coordinating the different activities of the *incisores vitri*, the *magistri vitri*, and the *magistri mosaici*. It also demonstrates the importance of an efficient and economical supply of tesserae to a large mosaic project.

The Orvietan evidence furthermore reveals a particular pattern of training and workshop procedure that militates against the traditional separation of *pictor* and *artifex*. Fra Giovanni Leonardelli, for example, carried out most of the related tasks in the production of the mosaics, including days spent actually cutting tesserae and applying mortar to the setting bed. Nearly all the mosaicists displayed a multifaceted competence in their art, having learned every aspect during the transformation from simple *puer* to master craftsman.

<sup>146</sup> Opera archive, *Testamenti*, Codice 38, fol. 137.

<sup>147</sup> See above, "Organization of the Mosaic Workshops."

<sup>148</sup> Fumi, *Duomo*, 137, Document cxxiv. See also my Document 87.

<sup>149</sup> Ibid., 137, Document cxxv.

<sup>150</sup> See above, "Dating and Subject Matter of the Mosaics."

<sup>151</sup> Fumi, *Duomo*, 137–39, Documents cxxvii–cxxx.

<sup>152</sup> See J. Le Goff, "Le temps du travail dans la 'crise' du XIVe siècle: Du temps médiéval au temps moderne," *Le Moyen Age* 69 (1963), 597–613, and A. Saporì, "Spazio e tempo: Cambiamento di mentalità e di vita di una società," in his *Studi di storia economica*, III (Florence, 1967), 352–63.

A poignant reminder of the subsequent fate of the mosaics occurs almost a hundred years after their completion. In November 1484, the advisory committee of the Opera del Duomo concluded that an immediate search must begin for qualified artists to repair the mosaics on the facade.<sup>153</sup> By that time, the original work of artists such as Orcagna or Ugolino di Prete Ilario had begun to deteriorate, sadly to be replaced over centuries of constant restoration. We must, therefore, be grateful for a different type of enterprise, that of the patient and faithful recording of the daily life of Orvieto cathedral by a series of obscure notaries. It is through them that we know so much about these mosaics.

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#### APPENDIX

This Appendix of documents is by necessity selective since the archives contain several thousand unpublished entries pertaining to the fourteenth-century mosaics and windows of Orvieto cathedral. Two main areas of inquiry determined my selection, namely, the supply and production of materials, and the different tasks and wages of the mosaic workshops between 1321 and ca. 1390.

As noted above, the material in the archives at Orvieto was first discussed by G. della Valle, and he either paraphrased or included excerpts from a selected number of documents in his summary of the cathedral's history.<sup>1</sup> L. Fumi subsequently published a greater number of records, while limiting his selection to important or "representative" entries.<sup>2</sup> He occasionally leaves out folio numbers and regularly omits essential phrases or entire sections of the documents, including references to the wages received by artists. The appropriate corrections to Fumi's work are provided here, along with many hitherto unpublished entries.

The documents have been renumbered to facilitate the discussion; any previous publication is given at the beginning of each entry. The spelling of certain words varies considerably but has been published as found in the original; abbreviations have been expanded and punctuation provided.

<sup>153</sup> Fumi, *Duomo*, 143, Document CLI.

<sup>1</sup> Della Valle, *Storia*.

<sup>2</sup> Fumi, *Duomo*.

The Orvietan calendar was based on the year of the Nativity, which was calculated from 25 December. There is only a slight discrepancy between the modern and Orvietan style of dating, and this is indicated in brackets where necessary.<sup>3</sup>

The quires are often bound in the wrong order, or at times upside down, hence the pagination may seem out of sequence. This is largely the result of the system of bookkeeping adopted by the Opera, in which the *camerarius* recorded incoming revenues in one half of a notebook, working his way toward the middle; the outgoing expenditure was recorded in the other half of the book, which had been turned upside down for that purpose.<sup>4</sup>

The system of currency used for transactions was that of the denarius (= d.) of Cortona: the lira or libra (= l.) was equivalent to 20 soldi or 240 denarii, the soldo (= s.) to 12 denarii. The Florentine gold florin (= fl.) was used on occasion.

The name of the treasury account books is abbreviated accordingly: *Camerarius* = *Cam.* and their relevant number. Unless otherwise indicated, all documents are in Orvieto, Opera Archive.

1. ( = della Valle, *Storia*, 268–69; Fumi, *Duomo*, 118, Documents xv, xvi)

*Cam. I*: 1321, 21 June, fols. 119–119v:

Viginti quattuor l. et VIII s.—solvit Consiglio stopario de castro Montisleonis pro duobus mensibus proxime preteritis inceptis a die XXI mensis aprilis proxime preteritis et hodie completis, quibus ipse servivit dicto opere apud fornacem vetri colorati qui erat in opere ad faciendum vetros coloratos et inauratos ad rationem XII l. per mensem et pro uno die quo ivit ad castrum Plagharii pro laborantibus vetrum coloratum predictum pro dictis VIII s. d. quibus fecit dicto camerario finem et refutationem presente magistro Laurentio magistri Mathani et aliis pluribus personis.

Decem l. et V s.—solvit Ghino Petri stopario de supradicto loco pro II mensibus proxime preteritis et hodie completis quibus ipse servivit dicto operi apud supradictam fornacem ad faciendum vetros predictos et ipse habuit pro expensis.

Quinque l. et XVIII s.—solvit Cole Petri Angeli

<sup>3</sup> A. Cappelli, *Cronologia cronografia e calendario perpetuo* (Milan, 1969), 11, 14.

<sup>4</sup> Italian medieval bookkeeping systems are examined in R. de Roover, "The Organization of Trade: Italian Hegemony in the Fourteenth and Fifteenth Centuries," *Cambridge Economic History of Europe*, ed. M. Postan, E. Rich, and E. Miller, III (Cambridge, 1963), 70–104, esp. 91.

de supradicto castro Montisleonis pro uno mense proxime preteriti et hodie completo quo servivit et stetit dicto opere apud supradictam fornacem vetri ad faciendum vetros coloratos predictos.

Duas l. duos s. et VI d.—solvit et dedit pluribus personis de pretio et in pretiis V barillorum vini quae unius habuerunt supradicti stoparii et socii eorum apud fornacem vetri colorati predicti pro expensis ipsis quo pacto fuit in quo ipsi haberent unius diei stantes in dicto opere.

III s.—solvit Frederico Frabutii petri fabri pro tribus diebus quibus servivit dicto opere ad sciogliendum vetrum coloratum pro XII d. per diem.

XXV s.—solvit supradicto magistro Consiglio stopario pro pretio unius canne de ferro forate pro sufflandis vetris pro apponendo super foglis auri battuti.

XXXII s.—solvit Petrucciolo Johannes manuali pro XII diebus proxime preteritis quibus servivit ad supradictam fornacem vetri colorati pro II s. VI d. per diem.

2. ( = della Valle, *Storia*, 269; Fumi, *Duomo*, 193 note 1)

*Cam. I*: 1321, 21 June, fol. 120v:

Die dominico XXI mensis junii.

Item viginti octo fl. de bono et puro auro valente ad currentem centum duodecim l. d. cortonen- sium ad rationem IIII l. pro quolibet fl. dedit inter septem vicibus et diversis diebus magistro Geruino Grifaldi battiloro auri et argenti di Spoleto pro battendis et faciendis foliis auri pro mittendis et operandis super vetris coloratis qui fecit et faciebat magistro Laurenti caputmagistrorum operis Sancte Marie cum magistris Consiglio et Ghino stopariis de castro Montisleonis suprascriptis ad fornacem vetri positam juxta portam episcopatus civitatis Urbisveteris - de quibus quidem fl. dictus Geruinus asseruit et dedit supradictis magistris et magistro Putio Locti aurifici qui mittebat dictum aurum super vetris coloratis LXXII folia auri pro quolibet fl. predictorum compensationem unum fl. cum alio d. assignavit foliorum predictorum; que folia auri omnes operate fuerunt super dictis vetris coloratis exceptis CXXXVII foliis que folia remanserunt in opere apud dictum camerarium in arca operis. Hec asseruit et confessus fuit dictus Geruinus habuisse et predicta fecisse coram me notario. His testibus magistro Laurentio magistri Maitani magistro Putio Locti aurifici Butti Barthi Magaloceti et Fino Bonifatii operaio dicti operis.

3.

*Cam. II*: 1330, 26 February, fol. 36:

Viginti l.—Consiglius stopparius habuit et recepit a dicto camerario pro septuaginta novem librarum vetri rubri ad rationem XXVIII d. pro libra et pro CLXXIII librarum vetri nigri novi, boni, polito ad rationem XV d. pro libra.

4.

*Cam. II*: 1332, 14 March, fol. 139v:

XVIII s. VI d.—solvit dictus Peputius camerarius magistro Blasio Butii videlicet pro IIII diebus ad altum ad mittendum muysicum pro IIII s. per diem et pro I die in loia ad incidendum vitra pro muisico pro III s. VI d. per diem.

5.

*Cam. II*: 1338, 7 December, fol. 429v:

Tres l. IIII s.—solvit et dedit dictus camerarius Angelutio Landi recipienti pro se et Butio Ildi-brandini pro VIII pedibus liste muysaici quos fecerunt et inmiserunt ad cottimum in anteriori pariete dicte ecclesie ad rationem VIII s. pro quolibet pede.

6.

*Cam. III*: 1345, 22 August, fol. 41:

X s.—solvit et dedit dictus camerarius magistro Lello fabro de Perusio pro pretio II cazolarum pro limando murum pro muysaico faciendo.

XXXIII s.—solvit et dedit dictus camerarius Guiliemo Petruccioli pro pretio unius fili ferri pro muysaico faciendo.

7.

*Cam. III*: 1347, 31 March, fol. 122:

Duecentos undecim l. et XVI s.—solvit et dedit dictus camerarius magistro Consiglio Ionte stopario de Monteleone pro pretio et pagamento V<sup>c</sup> LXIII petiorum vetri inaurati qui petius semper intelligatur de duabus linguectis vetri inaurati pro quolibet petio dicti vetri inaurati ad rationem II s. pro quolibet petio dicti vetri.

Item pro pretio V<sup>c</sup>XXXVII librarum vetri novi colorati ex diversis coloribus ad rationem IIII s. pro qualibet libra dicti vetri.

Et pro pretio III<sup>c</sup>LXIII librarum vetri veteris de

ritaglis ad rationem II s. et VI d. pro qualibet libra dicti vitri.

Item pro medietate victure dicti vitri III s. d. parvorum.

8.

*Cam. III*: 1347, 19 May, fol. 139:

X s.—solvit et dedit dictus camerarius Paulutio Venture pro pretio XV librarum vene de ferro pro colorando vetro.

9.

*Cam. III*: 1347, 30 November, fol. 196:

Magistro Johanne Bonini magistro musayti operis pro suo salario unius mensis et XVIII dierum proxime preteritis inceptis a die XIII mensis octobris proxime elapsis et finitis die predicto ultimo die mensis novembris ad rationem IIII fl. et tertium fl. pro quolibet mense pro rata a temporibus—sex fl. auri tres l. XVII s. VI d.

10. ( = Fumi, *Duomo*, 121, Document XL)

*Cam. III*: 1347, 14 December, fol. 198v:

Presentibus Francischo Andree Deodati capellano et ( . . . )<sup>5</sup> capituli canonicorum ecclesie Sancte Marie pro pensione domorum dicti capituli quas retinet magister Johannes Bonini magister musayci operis dicte ecclesie pro uno anno proxime preteritis incepto in festo nativitatibus proxime preteritis et finiundo in festo nativitatibus venturo—decem l. d.

11.

*Cam. III*: 1347, 17 December, fol. 203:

Vannutio Meii Pucci pisarii pro pretio I mortarii de metallo ponderis XVIII librarum et dimidie librae ad rationem III s. pro libra dicti mortarii pro pistando colores pro magistro Johanne de vitro—LVII s. d.

12.

*Cam. III*: 1348, 21 March, fol. 312v:

XXXVI s.—solvit ( . . . )<sup>6</sup> Pinghere pro pretio sex lignorum de castaneo pro ponte faciendo in facie anterioris ecclesie.

<sup>5</sup>Damaged in the original.

<sup>6</sup>Folio damaged in the original.

13.

*Cam. IV*: 1350, 28 July, fols. 199–199v:

Item dedit Johanni Petruccioli pro sex diebus quibus stetit ad incidendum vetrum ad rationem VIII s. pro die—II l. VIII s.

Item dedit Andree Nuti pro III diebus quibus stetit ad incidendum vetrum ad rationem VII s. pro die—I l. I s.

Item dedit Petro Putii pro sex diebus quibus stetit ad incidendum vetrum ad rationem VI s. pro die—I l. XVI s.

Item dedit et solvit dictus camerarius Cepto Vannutii pro sex diebus quibus stetit ad incidendum vetrum pro III s. pro die—XVIII s.

Item dedit Antonio Rossi pro pistatura IIII quartenghorum tebule pro faciendo collam pro musaico ad rationem VIII s. pro quartengho—I l. XII s.

14.

*Cam. IV*: 1350, 31 July, fol. 201:

Item dedit et solvit dictus camerarius fratri Johanni Buti qui stetit ad faciendum musaticum in dicto opere pro suo salario presentis mensis julii—sex fl. auri.

15.

*Cam. V*: 1358, 1 February, fol. 105:

Nerius Butii camerarius dictus dedit et solvit magistro Ugolino pictori pro III diebus quibus servivit ad fenestram vetri pro cappella corporalis ad rationem XXI s. pro die—tres l. tres s.

Item dictus camerarius dedit et solvit fratri Johanni pictori pro III diebus quibus servivit ad fenestram corporalis XXI s. pro die—tres l. tres s.

16.

*Cam. V*: 1358, 16 June, fol. 141v:

Item dictus Nerius camerarius dedit et solvit magistro Andree Cionis de Florentia conducto caputmagistro pro dicto opere Sancte Marie Maioris de Urbeveteri pro expensis factis per eum et socio et famulo ipsius et duobus equis in eundo et redeundo et pro expensis factis in Urbeveteri in octo diebus quibus steterunt in hospitio franciscani ( . . . )<sup>7</sup> a sacerdotibus ad quantitatem trium fl. et

<sup>7</sup>Damaged in the original.

octo s. d.—cum consensu dictorum superstitem dicti operis XV fl. octo s. d.—XV fl. auri VIII s. d.

17. ( = Milanesi, "Document," 106–8; Fumi, *Duomo*, 122, Document XLVIII)

*Memorie e Contratti, 1356–64*: 1359, 4 December, fol. 98:

Al nome di Dio, amen a dì IIII di dicembre MCCCLVIII. Questi sonno i pacti fatti per Donnino di Guglielmo da Fiorenze da l'una parte e ser Vanni di Lonardo camorlengo dell'uopera di Santa Maria d'Orvieto dall'altra parte per nome de la detta opera, con consentimento di mastro Andrea Cioni da Fiorenze capumaestro de la detta opera e di Guidecto di Vanni, Bartholomeio di Tone, Pietro di Ranucepto e Ciuccio di mastro Marcho soprastanti de la detta opera deputati per lu comune d'Orvieto, cioè ch'el detto Donnino promise d'andare ad Venetia al luoco, dove si fa el vetro per lu mosaico e da recare a la detta opera a tucte sue spese e passaggi due some di vetro per fare el mosaico de la facciata di Santa Maria di quelli colori e sagi e grossezza dati a lui per lu decto mastro Andrea, secundo esso Donnino ane in una carta pecorina, cioè:

Oro, fino di Chie a la quantità di C libre.  
Azuro co'gradi suoi libre C, cioè XX per digrado.  
Laccha co'gradi suoi libre L, cioè X per digrado.  
Biffa co'gradi suoi L libre cioè X per digrado.  
Verde co'gradi suoi libre L, cioè X per digrado.  
Vermiglio co'gradi suoi libre L, cioè X per digrado.  
Biancho candido L libre.  
Giallo co'gradi suoi L libre, cioè X per digrado.  
Incarnatione co'gradi suoi L libre, cioè XVI per digrado.  
Verdaccio co'gradi suoi L libre, cioè XVI per digrado.  
Nero co'gradi suoi libre XXX, cioè X per digrado.  
Ariento fino libre XXX.

Et si fussaro le due some più di peso, avanzino la laccha, la biffa e 'l verde, come toccherà per rata di ciascuno.

Et ch'el detto vetro sia buono e tengha e risponda biene al martello, e ch'el detto vetro sia accepto al detto maestro: in altro modo non sia tenuta l'opera di pagare.

E questo si promette el detto Donnino al detto camorlengo ricevenno per la detta opera. Imperciò che'l detto camorlengo ricevenno per la detta opera con consentimento del detto capumaestro e

di soprastanti, si promise al detto Donnino tollare el detto vetro dal detto Donnino e pagare a lui el prezzo quanto montasse in Orvieto contando la libra del detto vetro un convenevole prezzo secundo ch'el capumaestro iudicará.

Et se 'l detto Donnino arrecasse o volesse arrecare più vetro che detto è di sopra, el detto camorlengo promise a lui di tollare el detto vetro per quel convenevole prezzo che esso trovasse da altri si apparesse che per alcuno maestro si volesse fare più vetro per tucta la detta opera del mosaico. Et in questo caso promise el detto Donnino dare al detto vetro che facesse bisogno a la detta opera per questo e actendare el detto Donnino dega dare a la detta opera buona ricolta in Orvieto.

Et 'l detto camorlengo promise al detto Donnino tollare el detto vetro per quello prezzo che si trovasse da altro maestro tutto quello vetro che bisognasse al detto mosaico, e richiedere el detto Donnino infra spatio di duo mesi si vorrà fare e dare quello vetro, secundo quello prezzo che si trovasse da altri.

E dove el detto Donnino non volesse fare e dare el detto vetro per quello prezzo che si trovasse da altri, allora in quello caso e l'uopera non sia obbligata al detto Dondonino; ma possa tollare da qualunque maestro facesse, per meno che esso non contrarà le dette due some.

Et questo si promette el detto Donnino fare biene thalmente senza froda niuna.

18. ( = Fumi, *Duomo*, 123, Document XLVII; Offner, *Corpus*, 15)

*Cam. VI*: 1360, 7 February, fol. 46:

Item dedit et solvit Paccho Jacobelli pro sex foliis carte realis opportune magistro Andree de Florentia pro faciendis quibusdam figuris—IIII s.

Item dedit et solvit dicto Paccho pro una libra e dimidia colle pro collando cartam predictam pro dictis figuris faciendis ad rationem VI s. VI d. pro libra—VIII s. VIII d.

19.

*Cam. VI*: 1360, 7 March, fol. 57:

Dedit et solvit fratri Johanni Butii Leonardelli qui iuit cum uno socio ad Bulsenum pro tebulis necessariis pro calcina pro mosaico fiendo et stetit in toto duobus diebus pro ipso salario—I l. XVII s.

Et ipsorum expensis—I l. decem s.

20.

*Cam. VI: 1360, 12 April, fol. 72:*

Item dedit et solvit Butio Muscini Mictauti pro II stois pro ponte musaichi—s. decem.

21.

*Cam. VI: 1360, 23 May, fol. 87:*

Item fratri Johanni pro V diebus quibus stetit ad tagliandum vitrum pro musaico—. . .<sup>8</sup>

22.

*Cam. VI: 1360, 28 May, fol. 89v:*

Item dedit et solvit Butio Miscinii spetario pro pretio XVII stoarum videlicet pro XII quae posite fuerunt circumcirca pontem erectum in pariete dicte ecclesie pro musiaco fiendo et V pro ponendis in tecto supradicte ecclesie pro accocimine ipsius tecti ad rationem V s. pro qualibet—l. IIII, s. V.

23.

*Cam. VI: 1360, 7 June, fol. 93v:*

Item fratri Johanni pro tribus diebus quibus stetit ad ponendum collam in pariete anteriore dicte ecclesie pro musaico fiendo ad rationem XXI s. pro die—l. III s. III.

24.

*Cam. VI: 1360, 20 June, fol. 98v:*

Johanni Noritudinelli pro XXV diebus quibus servivit ad tagliandum vetrum pro musaico ad rationem II s. pro die pro deliberatione facta pro superstitis dicti operis ( . . . )<sup>9</sup> ad diem XVIII dicti mensis, et pro duobus diebus ad rationem VI s. pro die in deliberatione predictorum superstitum quod deliberaverunt quo a dicto die XVIII in cantia deputaverunt eidem VI s. pro quolibet die quo laboravit—l. III et s. II.

Item Johanni Petruccioli Batuti pro XX diebus quibus servivit ad predictum laboritium de dicto XVIII die et pro II diebus ad rationem VI s. pro die ( . . . ) deliberatione predictam factam ut supra de Johanne Noritudinelli—II l. XII s.

Item Bartolomeo ser Dominici pro XXVIII die-

bus quibus servivit in dicto labore ad rationem II s. VI d. in die—l. III s. X.

25.

*Cam. VI: 1360, 20 June, fol. 99v:*

Item Johanni Micchelutii pro II ancudinettis pro incidendo vitrum pro XX s. pro quolibet et pro V martellettis pro dicta laborita pro X. s. pro quolibet et pro duabus cacziolis pro VIII s. pro qualibet et XII librarum et dimidia ferri, laborati in grappis et pernis pro III s. X d. pro libra—l. VII s. XVI.

26.

*Cam. VI: 1360, 11 July, fols. 217–216 (sic):*

Item fratri Johanni pro II diebus quibus servivit ad tagliandum vetrum ad rationem XXI s. pro die—l. IIII s. IIII.

Item Johanni Noritudinelli pro V diebus quibus laborandum de vetro pro VI s. in die—I l. X s.

Item Johanni Petruccioli simul modo—I l. s. X.

Item Antonio Andreutii pro V diebus ad III s.—s. XV.

27.

*Cam. VI: 1360, 31 July, fol. 207v:*

Item Johanni Petruccioli pro uno scalpello et pro IIII ferris pro fratri Johanni et pro ritagliatura duarum lamarum—l. II s. V.

28.

*Cam. VI: 1360, 5 September, fol. 152v:*

Item dedit Lippo Pietro Magalotti Niccolaii pro X librarum senopie terre viridis et octrie quas voluit frater Johannes pro depingendo—s. VII d. IV.

29.

*Cam. VI: 1360, 31 October, fol. 173:*

Item solvit Marcho vasano pro IIII chistonchis factis pro ipso pro mittendo in fornace vetri et pro choquendo dictum vetrum—s. XIII d.

30.

*Cam. VI: 1360, 9 November, fol. 176:*

Item dedit et solvit dictus camerarius Vanciolo Johanni centenario pro pretio CV librarum rascie necessarie magistro vetri empte predictam camer-

<sup>8</sup>Left blank in the original.

<sup>9</sup>Damaged in the original.

arium a dicto Vanciolo ad rationem V l. pro quolibet centenari—l. V s. V d.

Item solvit Petrucciolo Marchi pro pretio III librarum ramate pro magistro predicto ad rationem IIII s. pro libro—s. XII

Item solvit Vaspe vascellario pro quibusdem lapidibus quos vocantur chuochili pro dicto magistro—s. XX.

Item solvit Vannutio Cioli pro quaedam mappa pro anniendo pulverum predicto magistro—s. XIII.

Item solvit Ceccho pro IIII salmis terre gialle quas tulit de Casaighi ad rationem IIII s. pro salma pro magistro vetri—s. XVI.

31.

*Cam. VI: 1360, 21 November, fol. 177v:*

Item Johanni Micchiluti ( . . . ) pro factura unius ramaioli ferris pro stenparando piombum ad rationem X s. et pro una tragula ferri pro magistro fornacis vetri ad rationem III s. X. d. pro libra fuit ponderis unius libre et dimidie et pro ramaiolo ferri pro dicto magistro pro sagis vetri fuit ponderis XI librarum et dimidie ad rationem III s. VIII d. pro libra et pro CXV puntis ad rationem XI s. pro centenari et pro XVIII ascis ad rationem IIII d. pro qualibet.—l. V s. VII.

32. ( = Fumi, *Duomo*, 126, Document LXXIV)

*Cam. VI: 1360, 5 December, fols. 181–181v:*

Item dedit et solvit Johanni Cioli pro II salmis terre, quas emit in castro Plagarii qui venit de Aritio pro faciendo mattoncellos fornacis pro laborando vetrum pro musaicho, fuit ponderis VI<sup>c</sup> librarum ad rationem XXV s. pro quolibet centenari—l. septem et s. X.

Item dedit dicto Johanni pro suis expensis et pro expensis cuiusdam somarii pro ferendo unam salmam predictae terre et pro vectura dicti somarii et pro vectura aliarum salmarum terre quas tulit Matheus vecturalis de Plagario—IIII l. XII s.

Item solvit Nallo Senerii pro pretio CL mattoni pro murando fornacem vetri ad rationem XXX s. pro centenari pro arechatura dicti mattoni pro uno—l. duas XIII s. d.

Item solvit Cecche et Menechutio eius filio pro arechatura XVIII salmarum terre gialle quas tulit de Casaighi pro murando fornacem pro vetro ad rationem IIII pro salma—l. tres et s. XII den.

Item pro pretio duarum stacciarum necessarium pro cerchis fornacis vetri—s. sex.

Item solvit pro pretio unius salme carbonis pro predicto opere—s. XII.

Item solvit Iontutio de Plagario pro pretio III<sup>c</sup> XXXV librarum marzacotti pro faciendo vetrum ad rationem unius fl. et dimidii pro quolibet centenari, et pro pretio LXXXXV librarum terre pro faciendo vasa pro coquendo vetrum pro musaicho ad rationem XXIII s. pro centenari—fl. quinque et l. duas et s. VIII d.

Item solvit Theo vecturali de Plagario pro vectura unius salme marzacotti quam tulit de Plagario—l. I et s. X.

Item solvit Menechutio Cocchi vecturali pro prestatura cuiusdem somarii quando ivit ad Plagarium et ad Consilium de Castro Montisleonis qui habebat ferramenta et terram pro vetro ad faciendum musaichum et pro expensis factis pro Giovanischo qui emit predictes res ad dicta loca—l. duas et s. XII.

33.

*Cam. VI: 1360, 24 December, fols. 186v–187:*

Item Nallutio Cobutili pro tribus diebus quibus laboravit in opere et pro uno die festivo quo servivit ad faciendum lignum pro fornace vetri ad rationem VII s. pro die—l. unam s. unum

Item Johanni Micchilutii pro I pari cisorarum pro magistris fornacis vetri XX s. et pro uno pontillo pro dictis magistris videlicet ferro V s. et pro CXX puntis ad rationem XI s. pro centenari et pro VII ascis ad rationem IIII d. pro qualibet—l. II s. III d. VI.

34. ( = Fumi, *Duomo*, 123, Document XLIX)

*Cam. VI: 1361, 18 February, fol. 252:*

Item dedit et solvit Zampino Nelli de Sancto Miniato pro pretio mille trecentorum quinquaginta librarum vitri facti per eum suis expensis secundum formam pactorum ad rationem quattuor fl. pro centenari, in qua quantitate vitri fuerunt septuaginta quinque librarum vitri inaurati per eum de auro dicti operis et centum triginta septem librarum vitri acrami et biffe, de qua quantitate vitri inaurati et acrami et biffe debet dictus Zampinus provideri per dictum opus, secundum discretionem et voluntatem superstitum ultra valorem et pretium dicti vitri non inaurati—quinquaginta quattuor fl. auri.



35. (= Fumi, *Duomo*, 123, Document LII)

*Cam. VI*: 1361, 2 March, fol. 257v:

Item dedit et solvit magistro Nutio de Monteleone pro X diebus quibus stetit ad docendum et ostendendum qualiter aurum mittebatur in vitro pro XX s. in die de mandato omnium superstitum dicti operis—decem l.

36.

*Cam. VI*: 1361, 17 April, fol. 308:

Nicolutie Butii pro libris XXVI christalli ad rationem X d. pro quolibet libro pro mistulando cum coloribus vitro muysatici—I. unam s. unam d. VIII.

37.

*Cam. VI*: 1361, 1 May, fol. 312v:

Pace Neruii dedit et solvit dictus camerarius pro una cultrice et uno pulvinari et I cultra quos fuerunt empte pro magistro Nello Jacomini de Roma magistro muysatici—III fl. et V s.

38.

*Cam. VI*: 1361, 27 May, fol. 317:

Caldanelli magistro lignamini pro IIII lignis castanci pro faciendo pontem magistri Nelli pro muysatito—s. VII.

39.

*Cam. VI*: 1361, 18 September, fol. 368:

Magistro Nello Jacomini de Roma pro uno mense quo laboravit ad faciendum musaichum in facciata ecclesie incipiendo dicto mense die VI mensis agosto et finiando die VI septembris prout pactam mani cancellarii—fl. X auri.

40. (= Fumi, *Duomo*, 128, Document LXXXII)

*Cam. VI*: 1361, 29 October, fol. 378v:

Item Giannam Micchilutii pro uno ferro quod vocatur pappatoio pro fornace vetri et pro uno cazolo fl. I auri et pro uno canello pro soffiando vetrum XXX s. et pro uno ferro quod vocatur rasoio ponderis XXII librarum ad rationem LX d. pro qualibet libra III s. X.—I. VIII s. X.

41.

*Cam. VI*: 1361, 27 November, fol. 386v:

Johanni Micchelutii pro uno spianatorio ferreo facto de chianis pro spianando vetrum—I. III s. X.

42. (= Fumi, *Duomo*, 131, Document xciii)

*Memorie e Contratti*, 1356–81: 1362, 30 September, fol. 155:

Anno MCCCLXII die XXX septembris presente fratre Johanne Butii et Loddo magistri Stabilis testibus in domo operis Sancte Marie.

Consegliis Ionte de Monteleone promisit et convenit Leonardo ser Tei camerario operis Sancte Marie presentibus et stipulantibus pro dicto opere facere et operari et laborare quattuor centenaria petiarum auri in vitro rosso bono et perfecto, videlicet quodlibet petium auri in duabus linguettis quam cito poterit, et quattuor centum librarum vitri albi boni de illo sano puro dato sibi pro fenestris capelle corporis christi et trecentas librarum vitri rossi facti de vitro novo et polito in illa grosseza data sibi, pro eo et ex eo quod dictus Leonardus nomine dicti operis promisit et convenit dicto Consiglio presente dare et solvere eidem Consiglio facto opere duos s. et VI d. pro quolibet petio auri in duabus linguettis ponendo et quattuor s. pro qualibet libra dicti vitri albi et rossi et solvere omnem victuram necessariam pro dicto opere facto mictendo et solvere eidem pro principio laborerii predicti aliquam quantitatem pecunie, videlicet X fl. et petium marmoris actum pro spianando vetrum inauratum, carregam, planam et forcelleriam, unum per tagliante de ferro et finito opere teneatur ipsas massaritas dictus Consiglius restituere dicto operi, salvo quod si dictum marmur frangeretur non teneatur restituere ipsum.<sup>10</sup>

43. (= Fumi, *Duomo*, 132, Document xciv)

*Cam. VI*: 1362, 5 November, fol. 441v (509v):

Item dedit et solvit Nucciarello nipote di Consiglio di Monteleone pro pretio trecento sexaginta librarum vetri rossi et nigri pro musaico ad rationem IIII s. pro qualibet libra—septaginta et uno l. et sedecim s.

<sup>10</sup>In the following year this addition was made to the folio: "MCCCLXIII. Dictus Consiglius restitit numptio operis predictas massaritas."

Item dedit et solvit pro victura dicti vitri—II l. VIII s.

Item solvit dictus Leonardus Coluo Nidutii pro pretio IIII centum foliorum auri pro vitro rosso pro musaico ad rationem VI l. et X s. pro centen-  
ario—viginta et sex l.

Fratri Johanni Butii pro tribus diebus quibus ivit et stetit ad Monteleonem pro docendo Nucciarellum nepotem magistri Consigli ad mictendum folia auri in vitro pro musaico pro XX s. in die—tres l.

44. ( = Fumi, *Duomo*, 132, Document xcv)

*Cam. VI*: 1362, 7 November, fol. 444 (512):

Magistro Mactheo de Bononia pro factura unius plane de metallo pro spianando vitrum pro auro que fuit XVIII librarum in pondere—IIII l. X s.

45.

*Cam. VI*: 1362, 26 November, fol. 449 (517):

Item solvit fratri Johanni Buti pro VIII lapidibus de Venetia pro musaico—XX s.

Item solvit fratri Johanni pro pretio unius cazole pro musaico—XIIII s.

46.

*Cam. VII*: 1363, 28 February, fol. 34v:

Item dedit et solvit fratri Giovanni Butii Leonardelli pro factura ad cottimum ( . . . )<sup>11</sup> fenestram vitri posteriorem in cappella corporis christi in quibus servivit et stetit XXIII diebus—XVI l.

47.

*Cam. VII*: 1363, 21 April, fol. 138:

Item dedit et solvit Vespe Nastillari pro pretio sexaginta tebullettarum plurime coloris pro musaico ad rationem IIII d. pro qualibet—XX s.

48.

*Cam. VII*: 1363, 1 June, fol. 150v:

Item solvit fratri Johanni Butii pro V librarum lapidis albis de Venetia pro musaico pro IIII s. pro libra—XX s.

49.

*Cam. VII*: 1363, 1 December, fol. 194:

Item dedit fratri Johanni pro suo salario mensis novembris—sex fl. auri.

50. ( = Fumi, *Duomo*, 132, Document xcix)

Orvieto, State Archive, *Riformanze*: 1363, 13 December, fol. 179v:

Millesimo III<sup>c</sup> LX tertio die XIII mensis decembris. Consiglius Ionte de Montelione promisit et convenit Paulutio Vannutii camerario operis recipienti pro dicto opere facere et laborare in duabus linguazzis unam petiam auri in vitro rubeo in illa quantitate quam dictus camerarius dederit et eidem Consiglio et hoc fecit quia dictus camerarius promisit dare eidem Consiglio pro factura et mectitura predicti auri pro qualibet petia XXXIII d. et retinere retalia vitri pro quolibet CXII s. d. et attendere et observare, etc.

51.

*Cam. VII*: 1364, 2 March, fol. 324:

Item dedit et solvit fratri Johanni Leonardelli pro pretio super laboraio musayci parietis anterioris ecclesie Sancte Marie predicte eius salario mensis februari proxime preteriti—sex fl. auri.

52.

*Cam. VII*: 1364, 23 April, fol. 338v:

Item dedit et solvit fratri Johanni Butii Leonardelli pro VIII<sup>c</sup> foliarum auri bactuti pro pondendis in vitro pro opere mosaychi quas detulit ad civitatem Senarum et pro expensis factis per eum in bactitura dicti auri et pro collecta ad exitum Senarum et pro cassecto et quadernis cartarum in quibus apportavit dictis foliis auri et pro pretio undecim librarum fili ramini subtilis pro fenestra vitri sancta cripta ecclesie in totum—XXI fl. auri.

53.

*Cam. VII*: 1364, 25 May, fol. 347:

Item dedit et solvit idem camerarius fratri Johanni Butii Leonardelli conducto et portatione super opere musayco parietis anterioris ecclesie

<sup>11</sup> Folio damaged in the original.

Sancte Marie pro XVIII diebus quibus laboravit in dicto opere ad rationem sex fl. auri pro quolibet mense computatis in his VI diebus quibus ivit et stetit et redivit ad civitatem Senarum pro auro operando in dicto musayco—III fl. auri, III l., XVIII s. d.

54.

*Cam. VII:* 1364, 25 May, fol. 347v:

Item dedit et solvit dictus camerarius fratri Johannis predicto pro eius salario mense maii iam elapso ad rationem predictam—sex fl. auri.

Item dedit et solvit dictus camerarius dicto fratri Johanni pro expensis factis per eum quando ivit pro opere et in servitium dicti operis ad castrum Montisleonis procurando vitros pro musayco dicte ecclesie—XIV s.

Item dedit et solvit dictus camerarius Consiglio de Monteleone pro residuo pretii ritaglierum vitri quos habere debeat a dicto operi facta et compensatione ipsarum pro superstites dicti operis—sex l.

Item dedit et solvit Ambrosio Petri Giannis pro vectura sui ronzuinii duobus diebus quem duxit frater Johannes Butii quando ivit ad Montemleonem pro faciendo fieri linguaczas vitri cum auro pro musayco—XX s.

55.

*Cam. VII:* 1365, 11 January, fol. 398:

Item Andree Nuti pro VIII diebus quibus laboravit in dicto opere pro VII s. per diem et pro laboratura et arrottatura XIII librarum quattuor marmoris pro musaico pro II s. pro libra—III l. II s.

56.

*Cam. VII:* 1365, 31 January, fol. 402:

Item dedit et solvit fratri Johanni Butii pro suo salario mensis presentis januarii—sex fl. auri.

57.

*Cam. VII:* 1365, 1 February, fol. 403v:

Item Bartholomeo ser Dominici pro XXI diebus quibus stetit in Monteleone ad mictendum aurum in vitro cum Nutarello magistro vitri pro XII s. per diem—XII l. XII s.

58.

*Cam. IV:*<sup>12</sup> 1365, 28 July, fols. 199–199v:

Item dedit Johanni Petruccioli pro sex diebus quibus stetit ad incidendum vetrum ad rationem VIII s. pro die—II l. VIII s.

Item dedit Andree Nuti pro III diebus quibus stetit ad incidendum vetrum ad rationem VII s. pro die—I l. I s.

Item dedit Petro Putii pro sex diebus quibus stetit ad incidendum vetrum ad rationem VI sol pro die—I l. XVI s.

Item dedit et solvit dictus camerarius Cepto Van-nutii pro sex diebus quibus stetit ad incidendum vetrum pro III s. pro die—XVIII s.

Item dedit Antonio Rossi pro pistatura IIII quartenghorum tebule pro faciendo collam pro musaico ad rationem VIII s. pro quartengho—I l. XII s.

59.

*Cam. IV:* 1365, 31 July, fol. 201:

Item dedit et solvit dictus camerarius fratri Johanni Buti que stetit ad faciendum musaticum in dicto opere pro suo salario presentis mensis julii—sex fl. auri.

60.

*Cam. VII:* 1366, 3 January, fol. 499:

Item Andree Nuti pro XVI ciotolis et V nastiltis pro tendendo vitrum—VII s.

61.

*Cam. VIII:* 1367, 27 February, fol. 82:

Item dedit et solvit magistro Ugolino magistri mosaici ad faciendum musaicum in pariete anteriore dicte ecclesie—sex fl. auri.

Item fratri Johanni ut supra—sex fl. auri.

62.

*Cam. VIII:* 1367, 18 August, fol. 17v:

Supradictis ser Laurentius camerarius dedit et solvit de predicto opere Antonio Muscini pro IIII

<sup>12</sup>Bound out of sequence.

librarum sinopie pro musaico ad rationem III s. libra—XII s.

Item dedit et solvit Menocutio magistri Vanarii pro I libro azuri pro musaico—II l. s. V.

63.

*Cam. VIII*: 1367, 21 August, fol. 18v:

Incisores Vitri:

Item dedit et solvit Andree Nutii pro V diebus quibus servivit in dicto opere ad rationem X s. in die et pro fattura VII librarum quattuoriorum de marmore pro musayco ad rationem III s. pro libra—III l. et II s.

Item dedit et solvit Angelutii Petri Angeli pro V diebus quibus servivit in dicto opere ad rationem VII s. in die—I l. XV s.

Item dedit et solvit Domenico magistri Petri pro V diebus quibus servivit in dicto opere ad rationem V s. in die—I l. V s.

Item dedit et solvit Cepto Vannutii pro V diebus quibus servivit in dicto opere ad rationem V s. in die—I l. V s.

Item dedit et solvit Angelo Lippi pro V diebus quibus servivit in dicto opere ad rationem IIII s. in die—I l.

64.

*Cam. VIII*: 1367, 23 October, fol. 37:

Item supradictus camerarius dedit et solvit Colao Guidutii pro pretio duarum librarum ochrie pro musayco—VII s.

65.

*Memorie e Contratti, 1356–81*: 1367, 3 November, fol. 39:

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Memoria che Bartholomeo de Cione alloco da Lorenzo de Lurno camorlengho de l'uopera per la detta opera una ponticha posta nela piazza de la chiesa nel cantone de la strada che va a Sancto Francischo, nela quale se fa la colla per lo musaico, per uno ano comenzato en kalende agosto proxime passato ad rastione de dodici l.—V l.d.

Die III de novembre

Dedit et solvit da Lorenzo al sopradetto Bartholomeo per pistione dela detta ponticha per cinque mesi comenzati in kalende agosto passato ala detta rastione de dodici l. ellanno.

66.

*Cam. VIII*: 1368, 29 January, fol. 142v:

Magistro Ugolino pro suo salario quo servivit supradicto opere ad faciendum muisaticum parietis antedictae ecclesie—sex fl. auri.

Item fratri Johanni pro suo salario—sex fl. auri.

67.

*Cam. VIII*: 1368, 25 November, fol. 202:

Septem l. XVI s.—dedit et solvit dictus camerarius de pecunia dicti operis fratri Johanni Leonardelli pro sex diebus quibus servivit in dicto opere et ad faciendum facte pontem ad faciendum cavare murum parietis minoris anditu ecclesie pro dicto musaycho cum voluntate predicto magistro et dictis superstitibus et magistro Paulo Matthei caputmagistro dicti operis ad rationem XXVI s. pro die quolibet.

68.

*Cam. VIII*: 1368, 2 December, fol. 203:

Item dedit et solvit dictus camerarius de pecunia dicti operis Andree Nutii pro sex diebus quibus in dicto opere servivit ad mictendum collam pro dicto musaycho fiendo ad rationem VIII s. pro die—II l. XIV s.

69. (= Fumi, *Duomo*, 134, Document cxii)

*Cam. VIII*: 1368, 30 December (= 1361, Orvietan style), fol. 212v:

Item dedit et solvit dictus camerarius de dicta pecunia Andree Nutii pro uno cottimo ad incollandum duas alas muri parietis anterioris ecclesie super januam baptismatis ad rationem quattuordecim l. d. cottumatas per fratrem Johannem Leonardelli et magistrum Paulum Matheii—XIIII l. d.

70.

*Memorie e Contratti, 1358–81*: 1369, 23 May, fol. 63v:

In nomine domini amen anno domini millesimo trecentesimo sexagesimo nono indictione septima tempore domini Urbani papi quinti die XXIII mai. In presentia mei notarii et testium subscriptorum ad hec specialiter vocatorum et rogatorum. Pateat omnibus evidenter hoc instrumentum publicum inspecturis quod Andreas Nutii de Urbeveteri et regione Sancti Laurentii constitutus person-

alem coram Petro Conelli Marchi camerario operis et fabrice Sancte Marie Maioris de Urbeveteri presenti et pro dicto opere et fabrice stipulanti et recipienti promisit et convenit ac se locavit bene diligenter laborare in dicto opere et fabrica hinc ad duos annos proxime futuros ad rationem VIII s.d. pro quolibet die quo servaverit in opere prelibato cum hoc pacto et conditione quod quando in dicto opere necesse est vel erit tempore supradicto incidere et laborare de vitro pro musaicho vel alias laborare promisit laboritum vitreum seu vitreum incidere et quocumque est necesse laborare in opere seu concimine petrarum muritii dicte ecclesie promisit etiam laborare ac stare et obedire ad dictum muritium seu laboritum faciendum ad petitionem dicti camerarii seu successorum suorum et magistri Pauli Matthei caputmagistri operis prelibati vel eius successoris in illis loco et partibus quibus videbitur seu placebit camerario et caputmagistris predictis.

Quam locatione et omnia et singula supradicta (. . . )<sup>13</sup>

Actum fuit hoc in civitate Urbeveteri in casella operis et fabrice predictorum solite residente camerarii supradicti presentibus fratre Johanne Buttii Leonardelli et Vannutio alias Paccho de Urbeveteri in testibus ad premissa habituris vocatis specialiter et rogatis.

71.

*Cam. IX:* 1369, 25 August, fol. 73v:

Item dedit et solvit dictus camerarius Petrutio Fei pro una libra sinopie et una libra ocrie et uno petio spongnie pro musaticho opportune—VII s.

72.

*Cam. IX:* 1370, 8 November, fol. 51:

Item Bantutio vascellario pro quattaginta quattro ciotulis de terre pro tenendo colores pro pintura tribune maiore—XX s.

73.

*Cam. X:* 1378, 15 February, fol. 212:

Incisores Vitri

Johanni Petruccioli pro IIII diebus quibus servivit ad incidendum vetrum ad rationem X s. pro die—II l.

Ludovico Johannis pro IIII diebus quibus servi-

vit ad incidendum vetrum ad rationem IIII s. pro die—XVI s.

74.

*Cam. X:* 1378, 17 December, fol. 312v:

Item dedit et solvit dictus camerarius Nucciarello Rallate de Monteleone pro mille quattaginta librarum vitri deaurati pro dicto opere et fabrice quae operate sunt in musaticho ad rationem III s. VI d. pro qualibet librarum vitri—in summa l. centum et ottantadue et XIV s.

75.

*Cam. X:* 1378, 17 December, fol. 313:

Item dedit et solvit magistro Andree Andreutii pictori pro sex diebus quibus servivit dicto opere ecclesie et fabrice in eundo et redeundo ad castrum Plagari pro faciendo venire dictum vitrum ad rationem XVII s. VIII d. pro quolibet die—in summa V l.

Item dedit et solvit Menichutio Cecchi et Vannutio Pauli pro victura supradicti vitri quos porterunt de castro Plagarii videlicet IIII salmis ad rationem quattaginta s. pro qualibet salma et pro pedagio dicti vitri videlicet triginta nonem s.—XVIII l.

76.

*Cam. X:* 1379, 4 June, fol. 357:

Item dedit et solvit magistro Antonio Andreutii pictori pro XVIII diebus quibus stetit ad laborandum cum Nucciarello in Monteleone ad faciendum vitrum inauratum pro musayco ad rationem XX s. pro quolibet die—XVIII l.

77.

*Cam. X:* 1380, 12 January, fol. 408:

Item Petro Cole mercatore pro I libra ocrie ad rationem III s. pro libra pro I libra verdeterra ad rationem IIII s. pro libra et pro I libra sinopie ad rationem VII s. pro musaico in summa—XIV s.

Item Gianututio Menecutii pro media libra azuri pro musaico ad rationem VIII s. pro qualibet oncia—II l. VIII s.

78.

*Cam. X:* 1380, 16 March, fol. 418v:

Magistro Petro Bartholomutii pro CXXXIII librarum lapidum de carnaccione pro musaico ad

<sup>13</sup>The "omnia et singula" clause omitted here mentioned a penalty of fifty soldi for non-completion of work.



rationem XVIII d. pro qualibet libra—in summa X l.

79.

*Cam. X*: 1380, 6 April, fol. 423:

Item magistro Giannis tomatori pro V maiorum cazolarum et scapellorum s. quattuor d. pro magistro musaici—IIII s.

Item Thomassi Michelutii pro CLXXII librarum grapporum pro ferrade frontispitium musaici super portam vescovati et aliarum grapporum et grappitellarum ad rationem IIII s. VI d. pro qualibet libra et pro VII martellinis pro tagliatoribus vitri ad rationem VIII s. pro qualibet libra in summa—XXXVIII l. XII s.

80.

*Cam. X*: 1380, 30 April, fol. 429v:

Item magistro Petro magistro musaici pro suo salario presentis mensis incepto die V mensis martii proxime preteritis et finito presente die fl. IIII auri—IIII fl. l. II s. XVII d. VIII.

81.

*Cam. X*: 1380, 30 June, fol. 471:

Item dedit et solvit magistro Ugolino pictori pro II diebus quibus laboravit de dicto mense junii ad faciendum musaycum super porta baptismatis—sex fl. auri.

82.

*Cam. X*: 1380, 14 July, fol. 473v:

Item dedit et solvit domine Lucia olim magistri Jacobi medici pro VIII unciis azzuri grossi emptis pro musayco ad rationem II bologninorum cum dimidie pro qualibet uncia—II l. s. II d. VIII.

83.

*Cam. XI*: 1381, 8 June, fol. 1v:

Incisores Vitri

Item Johanni Petrucci incisori vitri pro IIII diebus quibus servivit ad predicta ad rationem X s. pro die—II l.

Item Antonio magistri Petri incisori vitri pro IIII diebus quibus servivit ad predicta ad rationem VIII s. pro die—I l. XII s.

Item Petro Symonetti incisori vitri pro III diebus

quibus servivit ad predicta ad rationem VI s. pro die—XVIII s.

Item Luce Angelini incisori vitri pro IIII diebus quibus servivit ad predicta ad rationem VI s. pro die—I l. IIII s.

Item Domenico Nuti incisori vitri pro II diebus quibus servivit ad predicta ad rationem IIII s. pro die—VIII s.

Item Petro Vanni Grassi incisori vitri pro III diebus quibus servivit ad predicta ad rationem III s. pro die—IX s.

84.

*Cam. XI*: 1385, 20 January, fol. 109:

Item Matteo Ciutii vascellario pro X ciotulis emptis pro tenendo colores pro musayco—IIII s. d. VI.

85.

*Cam. XI*: 1385, 20 May, fol. 98:

Item dedit et solvit dictus camerarius Johanni Petrucciolo pro quinque diebus quibus servivit in dicto opere ad incidendo vitrum pro muisatico ad rationem VIII s. in die—II l.

86.

*Cam. XI*: 1385, 10 June, fol. 96:

Item solvit Bartolomeo Johanni Petrucciolo pro IIII diebus quibus servivit ad muisaticum ad rationem II s. in die—VIII s.

87.

*Cam. XI*: 1385, 24 June, fol. 95:

Item solvit Petro Putii magistro musatici ad rationem IIII fl. in mense presentis mensis et pro VIII diebus quibus servivit de mense maii ad dictam rationem—IIII fl. IIII l. II s.

88.

*Cam. XI*: 1385, 8 July, fol. 93v:

Item solvit Johanni Cechonis pro II milibus sexcenti bullettarum factis ( . . . )<sup>14</sup> pro muisatico pro XXXV s. milia—X s.

Item solvit pro scopis et lanandariis et vascellis emptis in muisatico—VII s.

<sup>14</sup>Damaged in the original.

89.

*Cam. XI*: 1386, 21 April, fol. 117:

Item Jacobo Allinisi pro IIII foliis carta regalis pro designando musaycum—V s.

90.

*Cam. XI*: 1386, 26 May, fol. 205:

Item magistro Petro Putii deputato super musayco pro eius salario dicti mensis ad rationem V fl. cum dimidio pro quolibet mense—V fl. et dimidio.

91.

*Cam. XI*: 1386, 8 December, fol. 366:

Item dedit et solvit dictus camerarius magistro Nucciarello de castro Montisleonis pro pretio XI<sup>c</sup> et XL librarum vetri pro ponendo aurum pro musayco ad rationem XVII l. et X s. pro quolibet centenario videlicet raserio et ( . . . )<sup>15</sup> dicti pretii—septuaginta duos l. et X s.

Item solvit pro gabella dicti vetri in castro Plagari—I l.

Item dedit et solvit dictus camerarius magistro Antonio pictori pro VIII diebus quibus stetit in castro Plagari ad ponendo dictum aurum ad rationem XVIII s. pro quolibet die—VIII l. s. II.

92.

*Cam. XI*: 1387, 23 February, fol. 233:

Item magistro Petro Putii pictori pro eius salario februari quibus stetit ad moysatichum ad rationem V fl. et dimidio—V fl. et dimidio.

<sup>15</sup>Damaged in the original.

93.

*Cam. XI*: 1387, 4 May, fol. 280:

Item Andruno Petri pro II libris sinopie clare sol. XVIII et pro una libra docria VII s. et pro una libra lapiszmatie s. XXVIII pro moysatito—in toto II l. XIII s. d.

94.

*Cam. XI*: 1388, 11 April, fol. 433:

Item dedit et solvit Angelutio Petri pro suo salario VI diebus quibus in dicto opere laboravit ad incidendum vitrum pro musayco ad rationem VIII s. in die—II l. VIII s.

Item dedit Antonio magistri Petri pro VI diebus ad rationem VIII s. in die—II l. VIII s.

95. ( = Fumi, *Duomo*, 139, Document cxxix)*Cam. XI*: 1388, 11 April, fol. 433v:

Item dedit et solvit magistro Petro Putii pictori pro suo salario XV diebus quibus in dicto opere laboravit musaychum fenestre facciate dicte ecclesie ad rationem XXV s. in die—VI l. V s.

96. ( = Fumi, *Duomo*, 139, Document cxxxii)*Cam. XI*: 1389, 10 October, fol. 522v:

Item dedit magistro Petro Putii pro duobus diebus quibus servivit in dicto opere ad musaycum ad rationem viginti quinque s. cum dimidio pro quolibet die et pro XII d. pro bullis pro dicto musaico et pro duabus unciis lapislamatis ad rationem quinque s. pro qualibet uncia—in totum l. tres. s. duos.